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MOBILE ELECTRONIC COMMERCE SYSTEM

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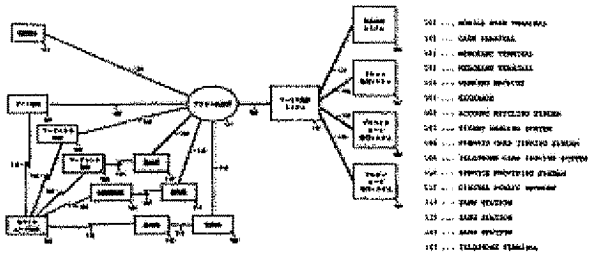
Abstract of **WO9909502**

A system that realizes an electronic commerce with an excellent level of safety and convenience. An electronic wallet (100) receives, through radio communications, installing of electronic tickets, electronic prepaid cards and electronic phonecards from a service providing means (110) of electronic commerce. By using these cards and tickets, the user receives goods, services and necessary permissions therefor from a supplier of goods and services. At this time, the user settles accounts by communicating with the terminals of the suppliers (101, 102, 103, 104, 105). The data for the account settling is sent from a supplier to the service providing means, where it is managed. Individual cards have, in addition to the portion to be shown to the supplier, a program portion for supporting transactions specific to the type of the card and a certificate portion indicating that the card has been registered for use. This system facilitates the acquisition of cards regardless of their locations and assures quick and accurate account settling.



MOBILE ELECTRONIC COMMERCE SYSTEM

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FIELD OF THE INVENTION

[0001] The present invention relates to an electronic commerce system that provides a settlement function for retail sales transactions involving the use of payment cards or credit cards (bank cards), a settlement function that provides for the employment of telephone cards for paying communication fees incurred through the use of mobile telephones, an examination function for verifying tickets issued for admission to various events, including concerts and movies, and a sales and distribution function for these payment cards, telephone cards and tickets. In particular, the present invention pertains to the maintenance of the usability and the safety of settlements, and to the facilitation of efficient and smooth business transactions.

BACKGROUND OF THE INVENTION

[0002] As the employment of telephone cards and payment cards, such as pinball game prepaid cards, has spread, prepaid systems for which magnetic cards are used to settle debts have become common. However, since there has been a corresponding increase in attendant problems, such as the illegal use of altered cards and excess charges imposed by retail shops, there is a demand that the safety of settlement systems be improved. Recently, an IC payment card has appeared that provides one countermeasure to illegal applications.

[0003] An explanation will now be given for the organization of a prepaid settlement system employing a conventional, general payment card.

[0004] In Fig. 138A is shown the organization of a prepaid settlement system using a conventional, common payment card.

[0005] In Fig. 138A, a payment card terminal 13801 is installed in a retail store 13806 and is used in the store for settlements for which payment cards are used. The payment card terminal 13801 is connected across a communication line 13804 to a central system 13802 operated by a payment card issuer 13807. At some stores, payment card terminals 13801 are connected via a POS system at the store and the communication line 13804 to the central system 13802 operated by a payment card issuer 13807.

[0006] To use a payment card to purchase a product at the retail store 13806, first, a consumer 13805 pays cash at the payment card store 13803, whereat payment cards are sold (13808), and purchases a payment card 1800 (13809). The sale of the payment card at this time is transmitted from the payment card store 13803 to the payment card issuer 13807 (13810).

[0007] Then, the consumer 13805 hands the payment card 13800 to a clerk at the retail store 13806 (13811) and requests that the payment card be used when processing the settlement.

[0008] Thereafter, the clerk inserts the payment card 13800 into the card reader of the payment card terminal 13801 and initiates the payment card settlement processing. In consequence, the payment card terminal 13801 reads current balance information from the payment card 13800, subtracts the price of the product from the available balance, and writes new balance information to the payment card. The payment card terminal 13801 also uses a printer to output a statement of account in which the price and the new payment card balance are specified.

[0009] The clerk hands the consumer 13805 the product, the payment card and the statement of account (13813 and 13812), and thus terminates the settlement processing using the payment card.

[0010] Following this, the payment card 13801 transmits the amount of the payment that was subtracted

from the balance on the payment card 13800 across the communication line 13804 to the central system 13802 of the payment card issuer 13807 (13814). In response, the payment card issuer 13807 performs a transaction to transfer money to the retail store 13806 (13815).

[0011] A payment card may be purchased from an automatic vending machine that is set up to sell payment cards. Further, the same basic arrangement is employed for a payment card terminal 1380 that is constituted by an automatic vending machine and a public telephone that has a settlement function for which a payment card is used.

[0012] In addition, as is disclosed in Japanese Examined Patent Publication No. Hei 6-103426, a system is proposed wherein a payment card and a card reader/writer authenticate each other by employing a digital signature as a safety countermeasure.

[0013] Now, consider the sale and use of tickets for various events, including concerts and movies, for which prepaid settlement processing is performed in addition to that performed by using a payment card. The tickets are sold on line, while when presented, they are visually examined by ushers.

[0014] In Fig. 138B is shown the arrangement of a conventional, common ticket vending system.

[0015] In Fig. 138B, for ticket sales a ticket vending terminal 13817 is installed in a ticket retail store 13820. The ticket vending terminal 13817 is connected via a communication line 13819 to a central system 13818 for a ticket issuer 13821.

[0016] To purchase a ticket for an event, a concert or a movie, first, the consumer 13805 calls the central system 13818 of the ticket issuer 13821 and makes a reservation for a desired ticket (13824). The center system 13818 reserves the ticket applied for, and issues a reservation number to the consumer 13805 (13825).

[0017] After the reservation number is received, at a ticket retail store 13820 the consumer 13805 gives a clerk the number and asks that a ticket be issued.

[0018] To issue the ticket, the clerk inputs the reservation number at the ticket vending terminal 13817. The ticket vending terminal 13817 transmits the reservation number to the central system 13818 of the ticket issuer 13821 (13827) via the communication line 13819. In response, the center system 13818 transmits the ticket information for the reserved ticket to the ticket vending terminal 13817 (13828).

[0019] Subsequently, the ticket vending terminal 13817 prints the received ticket information on a specific pasteboard blank designated by the ticket issuer 13821, and outputs the result as a ticket 13816. The clerk then delivers the ticket 13816 to the consumer 13805 (13830) in exchange for cash (13829) and the ticket vending process is terminated.

[0020] Then, following the subtraction of its commission, the ticket retail store 13820 transmits a record of the receipts for the sale of the ticket to the ticket issuer 13821, which, in turn, subtracts its commission from the record of receipts and transmits the result to the promotor of the event for which the ticket was sold (13834).

[0021] Later, the consumer 13805 presents the ticket 13816 to an usher 13822 at an event hall 13823 (13832), and after the usher 13822 visually examines the contents of the ticket and determines that all entries are correct, the consumer 13805 is permitted to enter.

[0022] Since according to the prepaid settlement system for which a conventional payment card is employed the settlement process is primarily performed by a retail store, it is possible for a retail store to cheat a consumer when performing the settlement process by charging a higher than authorized price for a product.

[0023] In addition, in the conventional settlement system it is possible for a retail store to so alter a payment card terminal that the price charged during a settlement process is higher than is that which is displayed on a cash register or is printed on the statement of account.

[0024] Furthermore, since basically, in a conventional settlement system, the balance information held by a payment card is rewritten by the payment card terminal, the retail store may modify the payment card

terminal so that the central system is charged a higher price than that which is actually subtracted from the balance recorded on the payment card.

[0025] Also, since in a conventional settlement system a payment card is loaded directly into a payment card terminal installed in a store, the retail store could modify the payment card terminal so that it alters the information stored on the card, or so that it illegally reads personal information other than that required for a settlement.

[0026] In order to prevent such an illegal modification of a payment card terminal, a physical countermeasure is required, such as the sealing of the terminal to prevent its disassembly, and this has constituted a barrier to a reduction in the size of a payment card terminal and to a reduction in the manufacturing costs.

[0027] Moreover, for a conventional settlement system, the capacity of the memory provided on a payment card is limited, and a consumer can not directly confirm an amount that has been subtracted from the payment card. Therefore, when a settlement is processed, a retail shop must deliver to a consumer a statement on which the price of a product and the remaining payment card balance is specified. This requirement constitutes a barrier to sales efficiency and to resource conservation.

[0028] According to a conventional ticket vending system, when buying a ticket a consumer must visit a ticket retail store, and this is inconvenient.

[0029] Also, as established by a conventional ticket vending system, the validation of a ticket is effected by examining the ticket visually, and such a process is not only inaccurate and inadequate but can be a contributing factor to the commission of an illegal act, such as the use of a counterfeit ticket.

[0030] Furthermore, according to the conventional ticket vending system, when a concert, for example, is canceled after a ticket is issued, to receive a refund the consumer must return to the ticket retail store, an additional inconvenient requirement.

[0031] And then, in accordance with a conventional settlement system and a conventional ticket vending system, when a consumer wishes to transfer to a friend, etc., a payment card or a ticket that has been purchased, the article must be physically delivered or mailed to the intended recipient, which constitutes one more inconvenience.

DISCLOSURE OF THE INVENTION

[0032] To resolve the above shortcomings of the conventional settlement system, it is one objective of the present invention to provide a mobile electronic commerce system that provides superior safety and usability.

[0033] According to the present invention, in a mobile electronic commerce system for paying, via wireless communication means, a required amount using an electronic wallet that includes wireless communication means, and for receiving, from a supply side, a product or a service, or a required permission, service means is provided for connecting the electronic wallet and the supply side via the communication means. The service means installs in the electronic wallet, via the communication means, a program for an electronic negotiable card. The electronic wallet employs the installed electronic negotiable card to obtain a product or a service, or a required permission, from the supply side. The settlement process using the negotiable card is performed by the electronic wallet and the supply side via the communication means. The data that are stored in the electronic wallet and at the supply side, in association with the settlement process, are transmitted to the service means at a predetermined time, and are managed by the service means.

[0034] In addition, the electronic wallet stores a program for an electronic payment card. The electronic wallet employs the payment card to pay an amount charged for a product or a service received from the supply side. The settlement process that takes place in conjunction with this payment is performed by the electronic wallet and the supply side via the wireless communication means.

[0035] Further, the electronic wallet also stores a program for an electronic telephone card. The electronic

wallet employs the telephone card to pay an amount that is charged by the supply side for voice communications carried by an exchange service operating via the wireless communication means. The settlement process that takes place in conjunction with this payment is performed by the electronic wallet and the supply side via the wireless communication means.

[0036] Furthermore, the electronic wallet stores an electronic ticket. By presenting the information held by the ticket, the electronic wallet and the supply side can engage in an examination process, via the wireless communication means, for the granting, by the supply side, of permission for the ticket to be used for admission.

[0037] According to this system, an electronic negotiable card, such as a payment card, a telephone card or a ticket, can be downloaded to the electronic wallet using the communication means and can thus be easily acquired. When the electronic payment card is used to purchase a product or to obtain a service, when the electronic telephone card is used to pay a communication fee, or when the electronic ticket is used to permit a person to pass through an entrance, a settlement process or an examination process is performed through the exchange of data by the electronic wallet and the supply side, so that rapid and accurate processing is enabled.

[0038] Since the data that are stored following the completion of a process, both in the electronic wallet and at the supply side, are periodically referred to/managed by the service means, an illegal act can be prevented.

[0039] According to the invention cited in claim 1, a mobile electronic commerce system for paying, via wireless communication means, a required amount from an electronic wallet that includes the wireless communication means and for receiving a product or a service, or a required permission, from a supply side, comprises:

service means for connecting the electronic wallet and the supply side via the communication means, wherein the service means installs, via the communication means, a program for an electronic negotiable card in the electronic wallet;
wherein the electronic negotiable card that is installed is employed to receive a product or a service, or a required permission, from the supply side;
wherein based on a program for the electronic negotiable card a settlement process for which the electronic negotiable card is used, is performed by the electronic wallet and the supply side via the communication means; and
wherein, in association with the settlement process, the data that are stored in the electronic wallet and at the supply side are transmitted to the service means at a predetermined time, and are managed thereat.

[0040] Thus, an electronic negotiable card can be easily purchased anywhere, and a settlement process performed for the electronic negotiable card is rapid and accurate.

[0041] According to the invention cited in claim 2, provided is a mobile electronic commerce system for paying, via wireless communication means, a required amount using an electronic wallet that includes the wireless communication means and for receiving a product or a service, or a required permission, from a supply side,
wherein, via the wireless communication means, the electronic wallet applies the purchase of a program for an electronic negotiable card to service means for issuing the program for the electronic negotiable card;
wherein the service means receives from electronic negotiable card issuing means data concerning the electronic negotiable card, and with settlement means performs a settlement that is associated with the purchase of the electronic negotiable card;
wherein, via the wireless communication means, the program for the electronic negotiable card is installed in the electronic wallet;
wherein the electronic negotiable card that is installed is employed for receiving a product or a service, or a required permission, from the supply side; and
wherein, based on the program for the negotiable card, a settlement process based on the use of the negotiable card is performed by the electronic wallet and the supply side via the communication means.

[0042] Therefore, the electronic negotiable card can be easily acquired anywhere, and its usability is improved.

[0043] According to the invention cited in claim 3, in the settlement process for which the negotiable card is used, the electronic wallet generates an electronic check corresponding to a payment amount based on the program provided for the negotiable card, and transmits the electronic check to the supply side via the wireless communication means. Then, the supply side, upon receiving the electronic check, transmits an electronic receipt to the electronic wallet. Thereafter, the electronic wallet and the supply side respectively store the electronic receipt and the electronic check as data concerning the settlement process.

[0044] Thus, the settlement process for the negotiable card is more accurately performed.

[0045] According to the invention cited in claim 4, in the settlement process for which the electronic negotiable card is used, based on the program provided for the electronic negotiable card the electronic wallet transmits data for the electronic negotiable card to the supply side via the wireless communication means. Then, the supply side, upon receiving the data for the electronic negotiable card, transmits to the electronic wallet an electronic certificate required for the granting of entrance permission and the admission of the owner of the electronic wallet. Thereafter, the electronic wallet and the supply side respectively store the electronic certificate and the data for the electronic negotiable card as data concerning the settlement process.

[0046] As a result, an examination process for tickets, etc., can be mechanically performed.

[0047] According to the invention cited in claim 5, in order to transfer the electronic negotiable card that is installed in the electronic wallet to a different electronic wallet, the electronic wallet generates a transfer message using the electronic negotiable card and transmits the message to the different electronic wallet. Then, the electronic wallet deletes the stored electronic negotiable card, and the different electronic wallet transmits, to the service means, the transfer message for the negotiable card. Thereafter, the service means installs a program for the electronic negotiable card in the different electronic wallet.

[0048] As a result, an electronic negotiable card can be transferred.

[0049] According to the invention cited in claim 6, the electronic wallet transmits to the service means, via the wireless communication means, an installation number to be recorded on or in a distribution medium, such as printed matter or a recording medium. Then, the service means receives, from negotiable card issuing means, data concerning an electronic negotiable card that is to be issued, and through wireless communication installs a program for an electronic negotiable card corresponding to the installation number.

[0050] As a result, while the printed matter on which the installation number has been printed is employed as a distribution medium, the program for the electronic negotiable card can be transmitted along the distribution route as a gift product.

[0051] According to the invention cited in claim 7, the service means manages a template program that is a model of a program for an electronic negotiable card, and based on the template program generates the program for the electronic negotiable card and installs the program in the electronic wallet.

[0052] As a result, based on the template program a variety of different types of electronic negotiable cards can be easily issued.

[0053] According to the invention cited in claim 8, a program for an electronic negotiable card includes an inherent private key. When an electronic wallet employs the negotiable card, the private key is employed to add a digital signature to data that are to be transmitted to a supply side via communication means.

[0054] As a result, the electronic wallet can confirm for the supply side that the data are valid that are generated based on the program provided for the negotiable card, and the alteration of the data by the supply side can be prevented.

[0055] According to the invention cited in claim 9, provided is a mobile electronic commerce system for paying, via wireless communication means, a required amount from an electronic wallet that includes the wireless communication means, and for receiving a product or a service, or a required permission, from a supply side,
wherein the electronic wallet holds an electronic payment card that serves as an electronic payment card program, and employs the electronic payment card when paying the required amount for the product or the

service that is received from the supply side; and
wherein, via the wireless communication means, the electronic wallet and the supply side perform a settlement process that is associated with the payment.

[0056] As a result, the performance of a business transaction involving the use of the electronic payment card is possible.

[0057] According to the invention cited in claim 10, an electronic payment card settlement means for making a payment using the electronic payment card is provided for the supply side.

[0058] As a result, the settlement process for the electronic payment card is performed between the electronic wallet and the electronic payment card settlement means.

[0059] According to the invention cited in claim 11, service means is provided to connect, via the communication means, the electronic wallet and the electronic payment card settlement means and to connect, via the communication means, the payment card issuing means and the settlement means, so that the electronic wallet can purchase the electronic payment card through the service means.

[0060] As a result, the electronic payment card can be purchased via the service means, and for use can be downloaded into the electronic wallet. Usability can therefore be improved.

[0061] According to the invention cited in claim 12, the electronic wallet, the electronic payment card settlement means, and the service means individually include a plurality of types of communication means. The electronic wallet, the electronic payment card settlement means, and the service means employ different communication means when communication among the three is conducted.

[0062] Therefore, smooth communication among the three is possible, and communication secrecy can be maintained.

[0063] According to the invention cited in claim 13, provided is a mobile electronic commerce system for paying, via wireless communication means, a required amount from an electronic wallet that includes the wireless communication means and for receiving a product or a service, or a required permission, from a supply side,
wherein the electronic wallet holds an electronic telephone card that serves as an electronic telephone card program, and employs the electronic telephone card when paying a required mount for a communication that is performed via wireless communication means using an exchange service provided by the supply side; and
wherein the electronic wallet and the supply side perform, via the wireless communication means, a settlement process that accompanies the payment.

[0064] As a result, communication can be performed using the electronic telephone card.

[0065] According to the invention cited in claim 14, the supply side includes communication line exchange means and electronic telephone card settlement means for settling the payment using the electronic telephone card.

[0066] Thus, the settlement process for the electronic telephone card is performed by the electronic wallet and the electronic telephone card settlement means.

[0067] According to the invention cited in claim 15, service means is provided for connecting, via the communication means, the electronic wallet and the electronic payment card settlement means, and for connecting, via the communication means, the payment card issuing means and the settlement means, so that the electronic wallet can purchase the electronic telephone card through the service means.

[0068] As a result, the electronic telephone card can be purchased via the service means, and for use can be downloaded into the electronic wallet. Usability can therefore be improved.

[0069] According to the invention cited in claim 16, the electronic wallet, the electronic telephone card settlement means, and the service means individually include a plurality of types of communication means. The electronic wallet, the electronic telephone card settlement means, and the service means employ different communication means when communication among the three is conducted.

[0070] Therefore, smooth communication among the three is possible, and communication secrecy can be maintained.

[0071] According to the invention cited in claim 17, provided is a mobile electronic commerce system for paying, via wireless communication means, a required amount from an electronic wallet that includes the wireless communication means and for receiving a product or a service, or a required permission, from a supply side,
wherein the electronic wallet holds an electronic ticket that is electronically constituted, and provides information concerning the electronic ticket; and
wherein the electronic wallet and the supply side perform, via the wireless communication means, an examination process for the electronic ticket for granting permission for an admission.

[0072] As a result, the mechanical examination of an electronic ticket can be automated.

[0073] According to the invention cited in claim 18, electronic ticket examination means for examining the electronic ticket is provided for the supply side.

[0074] Thus, the examination process can be initiated by communication between the electronic wallet and the electronic ticket examination means.

[0075] According to the invention cited in claim 19, service means is provided for connecting, via the communication means, the electronic wallet and the electronic ticket examination means, and for connecting, via the communication means, the ticket issuing means and the settlement means, so that the electronic wallet can purchase the electronic ticket through the service means.

[0076] As a result, the electronic ticket can be purchased via the service means, and for use can be downloaded into the electronic wallet. Usability can therefore be improved.

[0077] According to the invention cited in claim 20, the electronic wallet, the electronic ticket examination means, and the service means individually include a plurality of types of communication means. The electronic wallet, the electronic ticket examination means, and the service means employ different communication means when communication among the three is performed.

[0078] According to the invention cited in claim 21, a mobile electronic commerce system comprises:

an electronic wallet;
electronic payment card settlement means;
electronic telephone card settlement means;
electronic ticket examination means;
service provision means;
settlement processing means;
payment card issuing means;
telephone card issuing means; and
ticket issuing means.

[0079] Therefore, an electronic payment card, an electronic telephone card, and an electronic ticket can be purchased through the service providing means, and for use can be downloaded into the electronic wallet. Thus, usability is improved.

[0080] According to the invention cited in claim 22, the electronic wallet holds an electronic credit card and employs the electronic credit card to purchase the electronic payment card, the electronic telephone card or the electronic ticket.

[0081] Thus, a settlement that is accompanied by the purchase of an electronic payment card, an electronic telephone card or an electronic ticket is performed between the service providing means and the settlement processing means.

[0082] According to the invention cited in claim 23, the electronic wallet includes a plurality of kinds of wireless communication means as the plurality of types of communication means.

[0083] Usability in a mobile environment can therefore be improved.

[0084] According to the invention cited in claim 24, as means for engaging in wireless communication with the electronic payment card settlement means or the electronic ticket examination means, the electronic wallet includes wireless communication means that has a shorter communication distance and a higher directivity than has the wireless communication means employed for the electronic telephone card settlement or for the service providing means.

[0085] Since the distance between the electronic wallet and the electronic payment card settlement means, or between the electronic wallet and the electronic ticket examination means is at most 1 to 2 meters, the above described wireless communication means is selected, and thus a system can be obtained that is adequate for the environment in which it is used.

[0086] According to the invention cited in claim 25, as means for engaging in wireless communication with the electronic payment card settlement means or the electronic ticket examination means, the electronic wallet includes optical communication means and radio communication means for engaging in wireless communication with the electronic telephone card settlement means or the service providing means.

[0087] Thus, the optical communication means, such as infrared communication means, is employed for short distance communication between the electronic wallet and the electronic payment card settlement means, or for communication between the electronic wallet and the electronic ticket examination means, while the radio communication means is employed for long distance communication between the electronic wallet and the service providing means. As a result, a system can be obtained that is adequate for the environment in which it is used.

[0088] According to the invention cited in claim 26, the electronic payment card settlement means includes wireless communication means for engaging in communication with the service providing means.

[0089] Therefore, the settlement process can be performed in a mobile environment, and usability is improved.

[0090] According to the invention cited in claim 27, the electronic payment card settlement means is an automatic vending machine that includes automatic product or service providing means.

[0091] Thus, a product can be purchased at the automatic vending machine without any cash being required, and usability is improved.

[0092] According to the invention cited in claim 28, the electronic wallet comprises:

input means for entering a numerical value and for performing a selection operation;
a central processing unit for generating data to be transmitted via the wireless communication means, and for processing data received via the wireless communication means;
first storage means for storing a control program for controlling an operation performed by the central processing unit;
display means for displaying data processed by the central processing unit; and
second storage means for storing the data processed by the central processing unit,
wherein the electronic ticket, the electronic payment card or the electronic telephone card is stored in the second storage means.

[0093] As a result, the owner of the electronic wallet can operate the electronic wallet, and the electronic ticket, the electronic payment card or the electronic telephone card stored in the electronic wallet can be made available for use by the owner. Thus, usability of the electronic wallet is improved.

[0094] According to the invention cited in claim 29, the electronic payment card settlement means includes:

optical communication means for communicating with the electronic wallet;
communication means for communicating with the service providing means;
input means for entering a numerical value and performing a selection operation;
a central processing unit for generating data to be transmitted via the optical communication means and the

communication means, and for processing data received via the optical communication means and the communication means;
first storage means for storing a control program for controlling an operation performed by the central processing unit;
display means for displaying data processed by the central processing unit; and
second storage means for storing the data processed by the central processing unit,
wherein a settlement process program module for the electronic payment card is stored in the second storage means.

[0095] As a result, an operator can operate the electronic payment card settlement means, and the data stored in the electronic payment card settlement means can be made available to the person in charge. Thus, usability of the electronic payment card settlement means is improved.

[0096] According to the invention cited in claim 30, the electronic payment card settlement means comprises:

optical communication means for communicating with the electronic wallet;
radio communication means for communicating with the service providing means;
product identification means for identifying a product type;
input means for entering a numerical value and for performing a selection operation;
a central processing unit for calculating a charge for the product, for generating data to be transmitted via the optical communication means and the radio communication means, and for processing data received via the optical communication means and the radio communication means;
first storage means for storing a control program for controlling an operation performed by the central processing unit;
display means for displaying data processed by the central processing unit;
second storage means for storing the data processed by the central processing unit; and
third storage means for storing value information for the product,
wherein a settlement process program module for the electronic payment card is stored in the second storage means.

[0097] Therefore, the calculation of the payment for the product, and the settlement process can be performed in a mobile environment, so that usability is improved.

[0098] According to the invention cited in claim 31, the automatic vending machine comprises:

optical communication means for communicating with the electronic wallet;
radio communication means for communicating with the service providing means;
selection means for selecting a product to be purchased or a service;
automatic providing means for providing the product or the service;
a central processing unit for generating data to be transmitted via the optical communication means and the radio communication means, and for processing data received via the optical communication means and the radio communication means;
first storage means for storing a control program for controlling an operation performed by the central processing unit;
display means for displaying data processed by the central processing unit;
second storage means for storing the data processed by the central processing unit;
third storage means for storing value information and stock information for the product; and
fourth storage means for storing promotion information for the product or for the service,
wherein a settlement process program module for the electronic payment card is stored in the second storage means.

[0099] Therefore, the process extending from the time a product is promoted until it is sold can be automated, and usability is improved.

[0100] According to the invention cited in claim 32, the electronic telephone card settlement means comprises:

radio communication means for communicating with the electronic wallet;
communication means for communicating with the service providing means;
communication line exchange means for exchanging a plurality of communication lines;
a central processing unit for generating data to be transmitted via the radio communication means and the communication means, and for processing data received via the radio communication means and the communication means;
first storage means for storing a control program for controlling an operation performed by the central processing unit; and
second storage means for storing the data processed by the central processing unit,
wherein a settlement process program module for the electronic telephone card is stored in the second storage means.

[0101] Thus, the provision of the communication service and the collection of communication charges can be performed at the same time, and the rate at which the communication charges are collected can be improved.

[0102] According to the invention cited in claim 33, the electronic ticket examination means comprises:

optical communication means for communicating with the electronic wallet;
communication means for communicating with the service providing means;
input means for entering a numerical value and for performing a selection operation;
a central processing unit for generating data to be transmitted via the optical communication means and the communication means, and for processing data received via the optical communication means and the communication means;
first storage means for storing a control program for controlling an operation performed by the central processing unit;
display means for displaying data processed by the central processing unit; and
second storage means for storing the data processed by the central processing unit,
wherein an examination program module for the electronic ticket is stored in the second storage means.

[0103] As a result, the operator can operate the electronic ticket means, and the data stored in the electronic ticket means can be made available to the person in charge of the data, so that usability of the electronic ticket means is improved.

[0104] According to the invention cited in claim 34, the service providing means comprises:

user information storage means for storing information concerning the electronic wallet and information concerning a settlement contract concluded with an owner of the electronic wallet;
merchant information storage means for storing information concerning the electronic payment card settlement means, the electronic telephone card settlement means and the electronic ticket examination means, and information concerning a settlement contracts concluded with owners of electronic payment cards, electronic telephone cards and electronic tickets;
settlement processor information storage means for storing information concerning the settlement processing means;
payment card issuer information storage means for storing information concerning the payment card issuing means, and information concerning a settlement contract concluded with an owner of the payment card issuing means;
telephone card issuer information storage means for storing information concerning the telephone card issuing means, and information concerning a settlement contract concluded with an owner of the telephone card issuing means;
ticket issuer information storage means for storing information concerning the ticket issuing means, and information concerning a settlement contract concluded with an owner of the ticket issuing means;
service director information storage means for storing list information for the electronic wallet, the electronic payment card settlement means, the electronic telephone card settlement means, the electronic ticket examination means, the settlement processing means, the payment card issuing means, the telephone card issuing means and the ticket issuing means, and information concerning the electronic ticket, the electronic payment card and the electronic telephone card; and
a computer system for processing data in a service provision process for selling, issuing and managing the electronic ticket, the electronic payment card and the electronic telephone card.

[0105] As a result, the service providing means can efficiently manage the electronic wallet, the electronic payment card settlement means, etc., and provide the electronic payment card service, the electronic telephone card service and the electronic ticket service.

[0106] According to the invention cited in claim 35, the settlement processing means comprises:

communication means for communicating with the service providing means;
subscriber information storage means for storing information concerning a settlement contract concluded with an owner of the electronic wallet;
member shop information storage means for storing information concerning settlement contracts concluded with owners of electronic payment card settlement means, electronic telephone card settlement means, electronic ticket examination means, payment card issuing means, telephone card issuing means, and ticket issuing means; and
a computer system for processing data employed in a settlement process.

[0107] As a result, the settlement processing means can efficiently perform a settlement.

[0108] According to the invention cited in claim 36, the payment card issuing means comprises:

communication means for communicating with the service providing means;
customer information storage means for storing information concerning the purchase history of a customer;
payment card issuance information storage means for storing information concerning a payment card that has been issued;
payment card information storage means for storing information concerning the stock of payment cards; and
a computer system for processing data during a payment card issuing transaction process.

[0109] As a result, the payment card issuing means can efficiently issue payment cards.

[0110] According to the invention cited in claim 37, the telephone card issuing means comprises:

communication means for communicating with the service providing means;
customer information storage means for storing information concerning the purchase history of a customer;
telephone card issuance information storage means for storing information concerning a telephone card that has been issued;
telephone card information storage means for storing information concerning the stock of telephone cards; and
a computer system for processing data concerning a telephone card issuing transaction process.

[0111] As a result, the telephone card issuing means can efficiently issue telephone cards.

[0112] According to the invention cited in claim 38, the ticket issuing means comprises:

communication means for communicating with the service providing means;
customer information storage means for storing information concerning the purchase history of a customer;
ticket issuance information storage means for storing information concerning a ticket that has been issued;
ticket information storage means for storing information concerning the stock of tickets; and
a computer system for processing data concerning a ticket issuing transaction process.

[0113] As a result, the ticket issuing means can efficiently issue tickets.

[0114] According to the invention cited in claim 39, the electronic wallet generates and then transmits, to the service providing means, a payment card application message for the purchase of an electronic payment card; the service providing means, upon receiving the payment card application message, communicates with the payment card issuing means and receives therefrom an electronic payment card

issuance request message requesting that the service providing means perform an electronic payment card issuing process and an electronic payment card charge settlement process; the service providing means, upon receiving the request message, communicates with the settlement processing means to perform the settlement process for the charge for the payment card, generates an electronic payment card from payment card information that is generated by the payment card issuing means and is included in the electronic payment card issuance request message, and transmits the electronic payment card to the electronic wallet; and the electronic wallet, upon receiving the electronic payment card, stores the electronic payment card in the second storage means thereof.

[0115] Therefore, the owner of the electronic wallet can purchase anywhere, as an electronic payment card, a payment card that is issued by the payment card issuing means, and for use, can download it to the electronic wallet. As a result, usability is improved.

[0116] According to the invention cited in claim 40, a micro-check message, generated by an electronic payment card stored in the second storage means, is transmitted to the electronic payment card settlement means in order to confirm the submission of a payment that is the equivalent of an amount entered by the input means.

[0117] Since the payment amount is designated by the owner of the electronic wallet, the performance of an illegal act by a retail shop can be prevented.

[0118] According to the invention cited in claim 41, the electronic payment card settlement means, upon receiving the micro-check message, generates and then transmits, to the electronic wallet, the reception message to acknowledge that the micro-check message has been received.

[0119] Since the owner of the electronic wallet can confirm the contents of a transaction, the exchange of a printed receipt, such as a statement of account, is not required, and a sale can be performed more efficiently.

[0120] According to the invention cited in claim 42, the electronic wallet generates and then transmits, to the service providing means, a telephone card application message requesting the purchase of an electronic telephone card; the service providing means, upon receiving the telephone card application message, communicates with the telephone card issuing means and receives therefrom an electronic telephone card issuance request message indicating the service providing means has been requested to perform an electronic telephone card issuing process and an electronic telephone card charge settlement process; the service providing means, upon receiving the request message, communicates with the settlement processing means to perform the settlement for the charge for the telephone card, generates an electronic telephone card using telephone card information that is generated by the telephone card issuing means and is included in the electronic telephone card issuance request message, and transmits the electronic telephone card to the electronic wallet; and the electronic wallet, upon receiving the electronic telephone card, stores the electronic telephone card in the second storage means thereof.

[0121] Therefore, the owner of the electronic wallet can purchase anywhere, as an electronic telephone card, a telephone card that is issued by the telephone card issuing means, and for use can download it to the electronic wallet. As a result, usability is improved.

[0122] According to the invention cited in claim 43, a telephone micro-check message is generated by an electronic telephone card stored in the second storage means and is transmitted to the electronic telephone card settlement means in order to confirm the submission of a payment that is equivalent to an amount charged by the electronic telephone settlement means.

[0123] Therefore, wireless communication service using the prepaid settlement system can be obtained, and usability is improved.

[0124] According to the invention cited in claim 44, the electronic telephone card settlement means, upon receiving the telephone micro-check message, generates and then transmits, to the electronic wallet, a receipt message acknowledging that the telephone micro-check message has been received.

[0125] Thus, the owner of the electronic wallet can confirm the contents of a wireless communication service that is provided.

[0126] According to the invention cited in claim 45, the electronic wallet generates and then transmits, to the service providing means, a ticket application message requesting the purchase of an electronic ticket; the service providing means, upon receiving the ticket application message, communicates with the ticket issuing means, and receives therefrom an electronic ticket issuance request message that indicates the service providing means has been requested to perform an electronic ticket issuing process and an electronic ticket charge settlement process; the service providing means, upon receiving the request message, communicates with the settlement processing means to perform the settlement of the charge for the ticket, generates an electronic ticket from ticket information that is generated by the ticket issuing means and is included in the electronic ticket issuance request message, and transmits the electronic ticket to the electronic wallet; and the electronic wallet, upon receiving the electronic ticket stores the electronic ticket in the second storage means thereof.

[0127] Therefore, the owner of the electronic wallet can purchase anywhere, as an electronic ticket, a ticket that is issued by the ticket issuing means, and for use, can download it to the electronic wallet. As a result, usability is improved.

[0128] According to the invention cited in claim 46, the electronic wallet generates a ticket presenting message that describes the contents of the electronic ticket stored in the second storage means, and transmits the ticket presenting message to the electronic ticket examination means.

[0129] Therefore, tickets can be efficiently examined.

[0130] According to the invention cited in claim 47, the electronic wallet, upon receiving a command message from the electronic ticket examination means, changes the electronic ticket to a post-examined state, and generates and then transmits, to the electronic ticket examination means, a ticket examination response message that describes the contents of the electronic ticket that has been changed.

[0131] As a result, the tickets can be precisely and efficiently examined.

[0132] According to the invention cited in claim 48, the electronic ticket examination means, upon receiving the ticket examination response message, generates and then transmits, to the electronic wallet, an examination certificate message that verifies the electronic ticket has been examined.

[0133] Thus, the tickets can be more precisely examined.

[0134] According to the invention cited in claim 49, a first electronic wallet generates a payment card transfer certificate message verifying that the electronic payment card stored in the second storage means is to be transferred to a second electronic wallet, and transmits the payment card transfer certificate message via wireless communication means to the second electronic wallet; the second electronic wallet transmits, to the service providing means, the payment card transfer certificate message that is received; the service providing means performs an examination to establish the validity of the payment card transfer certificate message that is received, and transmits, to the second electronic wallet, the electronic payment card that is described in the payment card transfer certificate message; and the second electronic wallet stores, in the second storage means thereof, the electronic payment card that is received.

[0135] Therefore, the electronic payment card can be transferred to another person, and usability is improved.

[0136] According to the invention cited in claim 50, the second electronic wallet, upon receiving the payment card transfer certificate message, generates a payment card receipt message confirming that the payment card transfer certificate message has been received, and transmits the payment card receipt message via the wireless communication means to the first electronic wallet; and the first electronic wallet, upon receiving the payment card receipt message, deletes the electronic payment card stored in the second storage means thereof.

[0137] Therefore, the electronic payment card can be precisely transferred, and the problems that may accompany such a transfer can be avoided.

[0138] According to the invention cited in claim 51, a first electronic wallet generates a telephone card transfer certificate message confirming that the electronic telephone card stored in the second storage means is to be transferred to a second electronic wallet, and transmits the telephone card transfer

certificate message via wireless communication means to the second electronic wallet; the second electronic wallet transmits, to the service providing means, the telephone card transfer certificate message that is received; the service providing means performs an examination to establish the validity of the telephone card transfer certificate message that is received, and transmits, to the second electronic wallet, the electronic telephone card that is described in the telephone card transfer certificate message; and the second electronic wallet stores, in the second storage means thereof, the electronic telephone card that is received.

[0139] Therefore, the electronic telephone card can be transferred to another person, and usability is improved.

[0140] According to the invention cited in claim 52, the second electronic wallet, upon receiving the telephone card transfer certificate message, generates a telephone card receipt message confirming that the telephone card transfer certificate message has been received, and transmits the telephone card receipt message via the wireless communication means to the first electronic wallet; and the first electronic wallet, upon receiving the telephone card receipt message, deletes the electronic telephone card stored in the second storage means thereof.

[0141] Therefore, the electronic telephone card can be precisely transferred, and the problems that may accompany such a transfer can be avoided.

[0142] According to the invention cited in claim 53, a first electronic wallet generates a ticket transfer certificate message confirming that the electronic ticket stored in the second storage means is to be transferred to a second electronic wallet, and transmits the ticket transfer certificate message via wireless communication means to the second electronic wallet; the second electronic wallet transmits, to the service providing means, the ticket transfer certificate message that is received; the service providing means performs an examination to establish the validity of the ticket transfer certificate message that is received, and transmits, to the second electronic wallet, an electronic ticket that is described in the ticket transfer certificate message; and the second electronic wallet stores, in the second storage means thereof, the electronic ticket that is received.

[0143] Therefore, the electronic ticket can be transferred to another person, and usability is improved.

[0144] According to the invention cited in claim 54, the second electronic wallet, upon receiving the ticket transfer certificate message, generates a ticket receipt message confirming that the ticket transfer certificate message has been received, and transmits the ticket receipt message via the wireless communication means to the first electronic wallet; and the first electronic wallet, upon receiving the ticket receipt message, deletes the electronic ticket stored in the second storage means thereof. Therefore, the electronic ticket can be precisely transferred, and the problems that may accompany such a transfer can be avoided.

[0145] According to the invention cited in claim 55, the electronic wallet generates and then transmits, to the service providing means, an electronic payment card installation request message requesting the installation of an electronic payment card; the service providing means, upon receiving the payment card installation request message, communicates with the payment card issuing means and receives therefrom an electronic payment card installation request message indicating that the service providing means is requested to install an electronic payment card; the service providing means, upon receiving the request message, generates an electronic payment card using payment card information that is generated by the payment card issuing means and is included in the electronic payment card installation request message, and transmits the electronic payment card to the electronic wallet; and the electronic wallet, upon receiving the electronic payment card stores the electronic payment card in the second storage means thereof.

[0146] Therefore, the owner of the electronic wallet can install an electronic payment card in the electronic wallet anywhere.

[0147] According to the invention cited in claim 56, the electronic payment card installation request message includes electronic payment card installation information that is entered by input means for the electronic wallet and that uniquely describes an electronic payment card that is to be installed.

[0148] Therefore, the owner of the electronic wallet can install a desired electronic payment card in the electronic wallet.

[0149] According to the invention cited in claim 57, the electronic wallet generates and then transmits, to the service providing means, an electronic telephone card installation request message for requesting the installation of an electronic telephone card; the service providing means, upon receiving the telephone card installation request message, communicates with the telephone card issuing means, and receives therefrom an electronic telephone card installation request message indicating that the service providing means is to install an electronic telephone card; the service providing means, upon receiving the request message, generates an electronic telephone card using telephone card information that is generated by the telephone card issuing means and that is included in the electronic telephone card installation request message, and transmits the electronic telephone card to the electronic wallet; and the electronic wallet, upon receiving the electronic telephone card, stores the electronic telephone card in the second storage means thereof.

[0150] Therefore, the owner of the electronic wallet can install an electronic telephone card in the electronic wallet anywhere.

[0151] According to the invention cited in claim 58, the electronic telephone card installation request message includes the electronic telephone card installation information that is entered by input means for the electronic wallet and that uniquely describes an electronic telephone card that is to be installed.

[0152] Therefore, the owner of the electronic wallet can install a desired electronic telephone card in the electronic wallet.

[0153] According to the invention cited in claim 59, the electronic wallet generates and then transmits, to the service providing means, an electronic ticket installation request message requesting the installation of an electronic ticket; the service providing means, upon receiving the ticket installation request message, communicates with the ticket issuing means, and receives therefrom an electronic ticket installation request message indicating that the service providing means is to install an electronic ticket; the service providing means, upon receiving the request message, generates an electronic ticket using ticket information that is generated by the ticket issuing means and is included in the electronic ticket installation request message, and transmits the electronic ticket to the electronic wallet; and the electronic wallet, upon receiving the electronic ticket, stores the electronic ticket in the second storage means thereof.

[0154] Therefore, the owner of the electronic wallet can install an electronic ticket in the electronic wallet anywhere.

[0155] According to the invention cited in claim 60, the electronic ticket installation request message includes the electronic ticket installation information that is entered by input means for the electronic wallet and that uniquely describes an electronic ticket that is to be installed.

[0156] Therefore, the owner of the electronic wallet can install a desired electronic ticket in the electronic wallet.

[0157] According to the invention cited in claim 61, the electronic payment card installation information, the electronic telephone card installation information or the electronic ticket installation information consists of first identification information describing a type of electronic payment card, a type of electronic telephone card or a type of electronic ticket, and second identification information that uniquely describes an electronic payment card, an electronic telephone card or an electronic ticket, of a type described using the first identification information, that is to be installed. The second identification information is information generated at random.

[0158] Thus, an illegal installation that is performed for amusement can be prevented.

[0159] According to the invention cited in claim 62, the first identification information and the second identification information are represented by 8-digit numerals and 32-digit numerals.

[0160] As a result, using a simple numerical entry, a maximum of 100 million types of electronic payment cards, electronic telephone cards or electronic tickets, and a 10<32> assortment of a single type can be designated.

[0161] According to the invention cited in claim 63, an object whereon or wherein the electronic payment

card installation information, the electronic telephone installation information or the electronic ticket installation information is printed or engraved is employed as sales distribution means or transfer means for the electronic payment card, the electronic telephone card or the electronic ticket.

[0162] Therefore, the owner of the electronic wallet can reduce the communication costs involved in the purchase of such a card or a ticket, while he or she can use it as a gift. Thus, the distribution and the utilization of electronic payment cards, electronic telephone cards and electronic tickets can be improved.

[0163] According to the invention cited in claim 64, a recording medium on which the electronic payment card installation information, the electronic telephone installation information or the electronic ticket installation information is stored is employed as sales distribution means or transfer means for an electronic payment card, an electronic telephone card or an electronic ticket.

[0164] Therefore, the distribution and the utilization of electronic payment cards, electronic telephone cards and electronic tickets can be improved.

[0165] According to the invention cited in claim 65, the service providing means generates and then transmits, to the electronic wallet, a modification command message for the modification of the contents of the electronic ticket; and the electronic wallet, upon receiving the modification command message, updates the electronic ticket stored in the second storage means to provide a new electronic ticket as is described in the modification command message.

[0166] As a result, the contents of a ticket that has been issued can be changed at a low cost.

[0167] According to the invention cited in claim 66, the service providing means generates and then transmits, to the electronic wallet, a modification notification message for the modification of the contents of the electronic ticket; the electronic wallet, upon receiving the modification notification message, generates and then transmits, to the service providing means, a reaction selection message acknowledging receipt of the message for the modification of the contents of the electronic ticket; the service providing means, upon receiving the reaction selection message, generates and then transmits, to the electronic wallet, a modification command message instructing the modification of the contents of the electronic ticket; and the electronic wallet, upon receiving the modification command message, updates the electronic ticket stored in the second storage means to provide a new electronic ticket that is described in the modification command message.

[0168] As a result, the owner of the electronic ticket can be notified when there is a change in the contents of a concert, and can update the electronic ticket.

[0169] According to the invention cited in claim 67, the service providing means generates and then transmits, to the electronic wallet, a modification notification message for the modification of the contents of the electronic ticket; the electronic wallet, upon receiving the modification notification message, generates and then transmits, to the service providing means, a reaction selection message requesting a refund for the electronic ticket; the service providing means, upon receiving the reaction selection message, communicates with the settlement processing means to issue a refund for the electronic ticket, and generates and then transmits, to the electronic wallet, a refund receipt message indicating that a refund process has been completed; and the electronic wallet, upon receiving the refund receipt message, deletes the electronic ticket from the second storage means.

[0170] Therefore, the owner of the electronic ticket does not have to visit a ticket retail shop to obtain a refund, and can request and receive a refund anywhere.

[0171] According to the invention cited in claim 68, a computer system in the service providing means comprises:

user information processing means for communicating with the electronic wallet and for processing information stored in user information storage means;
merchant information processing means for communicating with the electronic payment card settlement means, the electronic telephone card settlement means or the electronic ticket examination means, and for processing information stored in merchant information storage means;
settlement processor information processing means for communicating with the electronic settlement processing means, and for processing information stored in settlement processor information storage

means;
payment card issuer information processing means for communicating with the payment card issuing means, and for processing information stored in payment card issuer information storage means;
telephone card issuer information processing means for communicating with the telephone card issuing means, and for processing information stored in telephone card issuer information storage means;
ticket issuer information processing means for communicating with the ticket issuing means, and for processing information stored in ticket issuer information storage means;
service director information processing means for communicating with the user information processing means, the merchant information processing means, the settlement processor information processing means, the payment card issuer information processing means, the telephone card issuer information processing means and the ticket issuer information processing means, and for interacting with those means while processing data during a service providing process; and
service manager information processing means for controlling the generation and the deletion of the user information processing means, the merchant information processing means, the settlement processor information processing means, the payment card issuer information processing means, the telephone card issuer information processing means, the ticket issuer information processing means and the service director information processing means.

[0172] Thus, the calculation function of the computer system can be efficiently distributed among the individual information processing means.

[0173] According to the invention cited in claim 69, the electronic wallet generates and then transmits, to the service providing means, a payment card registration request message requesting that the service providing means register, as an electronic payment card that is to be used by the owner of the electronic wallet, an electronic payment card that is stored in the second storage means; and the service providing means, upon receiving the payment card registration request message, registers the electronic payment card for use in the service director information storage means.

[0174] Therefore, an electronic payment card to be used and a sleeping electronic payment card can be managed separately, and an efficient service operation is possible.

[0175] According to the invention cited in claim 70, the service providing means, upon receiving the payment card registration request message, generates and then transmits, to the electronic wallet, a registered card certificate confirming that the electronic payment card has been registered for use; and the electronic wallet stores, in the second storage means, the registered card certificate that is received and changes the state of the electronic payment card to the usable state.

[0176] Since an electronic payment card must be registered before it can be used, if a sleeping electronic payment card that is not registered for use is stolen, it can not be used illegally.

[0177] According to the invention cited in claim 71, the electronic wallet generates and then transmits, to the service providing means, a telephone card registration request message requesting that service providing means register, as an electronic telephone card that is to be used by the owner of the electronic wallet, an electronic telephone card that is stored in the second storage means; and the service providing means, upon receiving the telephone card registration request message, registers the electronic telephone card for use in the service director information storage means.

[0178] Therefore, an electronic telephone card to be used and a sleeping electronic telephone card can be managed separately, and an efficient service operation is possible.

[0179] According to the invention cited in claim 72, the service providing means, upon receiving the telephone card registration request message, generates and then transmits, to the electronic wallet, a registered card certificate confirming that the electronic telephone card has been registered for use; and the electronic wallet stores, in the second storage means, the registered card certificate that is received and changes the state of the electronic telephone card to the usable state.

[0180] Since an electronic payment card must be registered before it can be used, if a sleeping electronic payment card that is not registered for use is stolen, it can not be used illegally.

[0181] According to the invention cited in claim 73, the electronic wallet generates and then transmits, to

the service providing means, a ticket registration request message requesting that the second storage means register, as an electronic ticket that is to be used by the owner of the electronic wallet, an electronic ticket that is stored in the second storage means; and the service providing means, upon receiving the ticket registration request message, registers the electronic ticket for use in the service director information storage means.

[0182] Therefore, an electronic ticket to be used and a sleeping electronic ticket can be separately managed, and efficient service operation is possible.

[0183] According to the invention cited in claim 74, the service providing means, upon receiving the ticket registration request message, generates and then transmits, to the electronic wallet, a registered ticket certificate that verifies the electronic ticket has been registered for use; and the electronic wallet stores, in the second storage means, the registered ticket certificate that is received, and changes the state of the electronic ticket to the usable state.

[0184] Since an electronic payment card must be registered before it can be used, if a sleeping electronic payment card that is not registered for use is stolen, it can not be used illegally.

[0185] According to the invention cited in claim 75, the electronic payment card comprises:

a payment card program;
presented card information describing the contents of the electronic payment card when issued; and
a card certificate indicating that the electronic payment card is authentic. The payment card program includes:
electronic payment card state management information; and
payment card program data for specifying an operation to be performed by the electronic payment card. The digital signature of the owner of the service providing means is provided for the presented card information.

[0186] As a result, a settlement performed with and a transfer of the electronic payment card can be safely effected.

[0187] According to the invention cited in claim 76, the payment card program includes a card signature private key that is employed for a digital signature provided for the electronic payment card. The card certificate is a public key certificate verifying that a card signature public key that is paired with the card signature private key is authentic.

[0188] Thus, a digital signature for the electronic payment card can be provided for a message generated by the electronic payment card, and the validity of the message can be verified. According to the invention cited in claim 77, a settlement program module for the electronic payment card includes two cryptographic keys, an accounting device authentication private key and a card authentication public key The payment card program includes an accounting device authentication public key, which is paired with the accounting device authentication private key, and a card authentication private key, which is paired with the card authentication public key.

[0189] Therefore, the electronic wallet and the electronic payment card settlement means can mutually perform the authentication process, and the safety of a settlement performed with the payment card is improved.

[0190] According to the invention cited in claim 78, the payment card program data includes:

a transaction module program for specifying the procedures to be used for message data that are exchanged by the electronic wallet and the electronic payment card settlement means;
a display module program for specifying the manner in which the electronic payment card is to be displayed; and
representative component information for the electronic payment card. A central processing unit in the electronic wallet processes, in accordance with the transaction module program for the electronic payment card, the message data that are exchanged with the electronic payment card settlement means, and displays the representative component information in accordance with the display module program of the electronic payment card, so that on display means the electronic payment card is displayed in the electronic

wallet.

[0191] Various types of electronic payment cards can be safely issued by employing together the transaction module program, the display module program and the representative component information.

[0192] According to the invention cited in claim 79, a template program that constitutes a model for the electronic payment card is stored in the payment card issuer information storage means for the service providing means.

[0193] Thus, various types of electronic payment cards can be safely issued by individual payment card issuers.

[0194] According to the invention cited in claim 80, the template program for the electronic payment card includes:

a transaction module program for the electronic payment card;
a display module program; and
representative component information.

[0195] Therefore, various types of electronic payment cards can be safely issued.

*[0196] According to the invention cited in claim 81, the electronic telephone card comprises:

a telephone card program;
presented card information describing the contents of the electronic telephone card when issued; and
a card certificate indicating that the electronic telephone card is authentic. The telephone card program includes:
electronic telephone card state management information; and
telephone card program data for specifying an operation to be performed by the electronic telephone card. The digital signature of the owner of the service providing means is provided for the presented card information.

[0197] As a result, the settlement of a communication fee by using the telephone card and the transfer of the telephone card can be performed safely.

[0198] According to the invention cited in claim 82, the telephone card program includes a card signature private key that is employed for a digital signature provided for the electronic telephone card. The card certificate is a public key certificate verifying that a card signature public key that is paired with the card signature private key is authentic.

[0199] Thus, a digital signature for the electronic telephone card can be provided for a message generated by the electronic telephone card, and the validity of the message can be verified.

[0200] According to the invention cited in claim 83, a settlement program module for the electronic telephone card includes two cryptographic keys, an accounting device authentication private key and a card authentication public key. The telephone card program includes an accounting device authentication public key, which is paired with the accounting device authentication private key, and a card authentication private key, which is paired with the card authentication public key.

[0201] Therefore, the electronic wallet and the electronic telephone card settlement means can mutually perform the authentication process, and the safety of a settlement performed with the telephone card is improved.

[0202] According to the invention cited in claim 84, the telephone card program data includes:

a transaction module program for specifying the procedures to be used for message data that are exchanged by the electronic wallet and the electronic telephone card settlement means;

a display module program for specifying the manner in which the electronic telephone card is to be displayed; and
representative component information for the electronic telephone card. A central processing unit in the electronic wallet processes, in accordance with the transaction module program for the electronic telephone card, the message data that are exchanged with the electronic telephone card settlement means, and displays the representative component information in accordance with the display module program for the electronic telephone card, so that on display means the electronic telephone card is displayed in the electronic wallet.

[0203] Various types of electronic telephone cards can be safely issued by employing together the transaction module program, the display module program, and the representative component information.

[0204] According to the invention cited in claim 85, a template program that constitutes a model for the electronic telephone card is stored in the telephone card issuer information storage means for the service providing means.

[0205] Thus, various types of electronic telephone cards can be safely issued by individual telephone card issuers.

[0206] According to the invention cited in claim 86, the template program for the electronic telephone card includes:

a transaction module program for the electronic telephone card;
a display module program; and
representative component information.

[0207] Therefore, various types of electronic telephone cards can be safely issued.

[0208] According to the invention cited in claim 87, the electronic ticket comprises:

a ticket program;
presented ticket information describing the contents of the electronic ticket when issued; and
a ticket certificate indicating that the electronic ticket is authentic. The ticket program includes:
electronic ticket state management information; and
ticket program data for specifying an operation to be performed by the electronic ticket. The digital signature of the owner of the service providing means is provided for the presented ticket information.

[0209] As a result, the examination and the transfer of the electronic telephone card can be performed safely.

[0210] According to the invention cited in claim 88, the ticket program includes a ticket signature private key that is employed for a digital signature provided for the electronic ticket. The ticket certificate is a public key certificate verifying that a ticket signature public key that is paired with the ticket signature private key is authentic.

[0211] Thus, a digital signature for the electronic ticket can be provided for a message generated by the electronic ticket, and the validity of the message can be verified.

[0212] According to the invention cited in claim 89, an examination program module for the electronic ticket includes two cryptographic keys, a gate authentication private key and a ticket authentication public key. The ticket card program includes a gate authentication public key, which is paired with the gate authentication private key, and a ticket authentication private key, which is paired with the ticket authentication public key.

[0213] Therefore, the electronic wallet and the electronic ticket examination means can mutually perform the authentication process, and the safety of the examination performed for the ticket is improved.

[0214] According to the invention cited in claim 90, the ticket program data includes:

a transaction module program for specifying the procedures to be used for message data that are exchanged by the electronic wallet and the electronic ticket examination means;
a display module program for specifying the manner in which the electronic ticket is to be displayed; and representative component information for the electronic ticket. A central processing unit in the electronic wallet processes, in accordance with the transaction module program for the electronic ticket, the message data that are exchanged with the electronic ticket examination means, and displays the representative component information in accordance with the display module program for the electronic ticket, so that on display means the electronic ticket is displayed in the electronic wallet.

[0215] Various types of electronic tickets can be safely issued by employing together the transaction module program, the display module program, and the representative component information.

[0216] According to the invention cited in claim 91, a template program that constitutes a model for the electronic ticket is stored in the ticket issuer information storage means for the service providing means.

[0217] Thus, various types of electronic tickets can be safely issued by individual ticket issuers.

[0218] According to the invention cited in claim 92, the template program for the electronic ticket includes:

a transaction module program for the electronic ticket;
a display module program; and
representative component information.

[0219] Therefore, various types of electronic tickets can be safely issued.

[0220] According to the invention cited in claim 93, identification information that describes a payment method selected by the input means for the electronic wallet is included in the payment card application message issued by the electronic wallet when requesting the purchase of an electronic payment card.

[0221] Therefore, the payment method can be selected when an electronic payment card is purchased, and usability is improved.

[0222] According to the invention cited in claim 94, the electronic payment card issuance request message or the electronic payment card installation request message includes template program identification information for designating, in the order to be used for the generation of an electronic payment card, one of a plurality of template programs that are stored in the payment card issuer information storage means.

[0223] Therefore, the payment card issuing means can designate a template program to be used for the electronic payment card, and can issue various types of electronic payment cards.

[0224] According to the invention cited in claim 95, the electronic payment card issuance request message or the electronic payment card installation request message includes representative component information describing the representative component information to be used for an electronic payment card that is to be generated.

[0225] Therefore, selected representative component information can be employed when an electronic payment card is issued, and a high degree of freedom can be exercised in the selection of the type of electronic payment card that is to be issued.

[0226] According to the invention cited in claim 96, the electronic wallet generates and then transmits, to the service providing means, a payment card registration request message requesting that the service providing means register, as an electronic payment card that is to be used by the owner of the electronic wallet, the electronic payment card stored in the second storage means for the electronic wallet; the service providing means, upon receiving the payment card registration request message, newly generates, for the electronic payment card, a card signature private key, a card signature public key and a registered card certificate for authenticating the card signature public key, registers the electronic payment card for use in the service director information storage means, and then transmits, to the electronic wallet, the card signature private key and the registered card certificate; and the electronic wallet updates the card

signature private key and the registered card certificate that are in storage by replacing them with those that have newly been received, and changes the state management information for the electronic payment card to a usable state.

[0227] Since the signature key for the electronic payment card is updated for use by the registration, safety is improved.

[0228] According to the invention cited in claim 97, the electronic wallet employs an electronic payment card, which is selected by input means for the electronic wallet from among those stored in the second storage means, to generate a micro-check message that verifies a payment corresponding to an amount entered by the input means, and transmits the micro-check message to the electronic payment card settlement means.

[0229] Therefore, an electronic payment card to be used can be selected, and usability can be improved.

[0230] According to the invention cited in claim 98, the electronic wallet employs an electronic payment card, which is selected by input means of the electronic wallet from among those stored in the second storage means, to generate a payment offer message that offers a payment corresponding to an amount entered by the input means, and transmits the payment offer message to the electronic payment card settlement means; the electronic payment card settlement means, upon receiving the payment offer message, generates and then transmits, to the electronic wallet, a payment offer response message that assesses a charge corresponding to an amount entered by input means for the electronic payment card settlement means; the electronic wallet, upon receiving the payment offer response message and if the assessed charge is equal to or smaller than an amount entered by the input means for the electronic wallet, subtracts the assessed charge from a remaining amount stored on the electronic payment card, and generates and then transmits, to the electronic payment card settlement means, a micro-check message validating a payment corresponding to the assessed charge; the electronic payment card settlement means stores the received micro-check message in the second storage means for the electronic payment card settlement means, and generates and then transmits, to the electronic wallet, a receipt message confirming that the micro-check message has been received; and the electronic wallet stores the received receipt message in the second storage means for the electronic wallet.

[0231] Since an amount higher than that designated by the owner of the electronic wallet is not paid, safety can be improved.

[0232] According to the invention cited in claim 99, the payment offer message includes:

a payment amount entered by the input means of the electronic wallet;
presented card information and a registered card certificate for the electronic payment card; and
state management information to which a digital signature has been added using the card signature private key.

[0233] Therefore, the contents of the electronic payment card to be used for the payment are concisely presented to the electronic payment card settlement means, so that the electronic payment card settlement means can determine whether the card is a valid electronic payment card.

[0234] According to the invention cited in claim 100, the micro-check message includes:

a payment amount;
an amount remaining stored on the electronic payment card;
identification information for the electronic payment card settlement means; and
identification information for the owner of the electronic payment card settlement means. Further, a digital signature is provided for the micro-check message by using the card signature private key for the electronic payment card.

[0235] As a result, the amount of the payment and the person making the payment are verified, and the imposition of an illegal charge by a retail shop can be prevented.

[0236] According to the invention cited in claim 101, the digital signature of the owner of the electronic

wallet is also provided for the micro-check message.

[0237] Since a determination is made as to whether or not the micro-check was issued by the owner of the electronic payment card, an examination of the validity of the micro-check can be precisely performed.

[0238] According to the invention cited in claim 102, the micro-check message includes a micro-check issuing number representing the order in which micro-check messages are generated by the electronic payment card.

[0239] Since the matching of the order of generation of the micro-check and the amount remaining can be determined, an examination of the validity of the micro-check can be more precisely performed.

[0240] According to the invention cited in claim 103, at a time designated by the service providing means, the electronic payment card settlement means generates an upload data message that includes data stored in the second storage means for the electronic payment card settlement means, and then transmits the upload data message to the service providing means; the service providing means, upon receiving the upload data message, examines the validity of a micro-check that is included in the upload data message by comparing the micro-check with registration information for the electronic payment card that is registered in the service director information storage means, and generates and then transmits, to the electronic payment card settlement means, an update data message that includes update data for the second storage means for the electronic payment card settlement means; and the electronic payment card settlement means extracts the update data from the update data message that is received, and updates data stored in the second storage means.

[0241] Therefore, the micro-check that has been used can be automatically collected, and can be examined to determine its validity.

[0242] According to the invention cited in claim 104, a first electronic wallet generates a payment card transfer offer message containing an offer to transfer, to a second electronic wallet, an electronic payment card that is stored in the second storage means, and then transmits the payment card transfer offer message, via the wireless communication means, to the second electronic wallet; the second electronic wallet, upon receiving the payment card transfer offer message, generates a payment card transfer offer response message indicating that the contents of the payment card transfer offer message are accepted, and then transmits the payment card transfer offer response message, via the wireless communication means, to the first electronic wallet; and the first electronic wallet, upon receiving the payment card transfer offer response message, generates and then transmits, to the second electronic wallet, a payment card transfer certificate message confirming the transfer of the electronic payment card to the second electronic wallet.

[0243] Therefore, the side that is to transfer the electronic payment card and the side that is to receive the electronic payment card can perform negotiations concerning the contents.

[0244] According to the invention cited in claim 105, the payment card transfer offer message includes:

presented card information, and a card certificate or a registered card certificate for the electronic payment card;
and
state management information having an added digital signature prepared using a card signature private key.

[0245] Thus, the side to which the electronic payment card is to be transferred can confirm its contents in advance.

[0246] According to the invention cited in claim 106, the payment card transfer offer message includes a public key certificate for the owner of the first electronic wallet; a digital signature of the owner of the first electronic wallet is provided for the payment card transfer offer message; the payment card transfer offer response message includes a public key certificate for the owner of the second electronic wallet; a digital signature of the owner of the second electronic wallet is provided for the payment card transfer offer message; the payment card transfer certificate message includes identification information for the public key certificate of the owner of the first electronic wallet and identification information for the public key

certificate of the owner of the second electronic wallet; and a digital signature using a card signature private key for the electronic payment card and a digital signature of the owner of the first electronic wallet are provided for the payment card transfer certificate message.

[0247] Thus, the person to whom the electronic payment card is to be transferred is guaranteed, and even when the payment card transfer certificate is stolen, the unauthorized use of card can be prevented.

[0248] According to the invention cited in claim 107, identification information that describes a payment method selected by the input means of the electronic wallet is included in the telephone card application message issued by the electronic wallet when requesting the purchase of an electronic telephone card.

[0249] Therefore, the payment method can be selected when an electronic telephone card is purchased, and usability is improved.

[0250] According to the invention cited in claim 108, the electronic telephone card issuance request message or the electronic telephone card installation request message includes template program identification information for designating, following the order that is to be used for the generation of electronic telephone cards, one of a plurality of template programs that are stored in the telephone card issuer information storage means.

[0251] Therefore, the telephone card issuing means can designate a template program to be used for the electronic telephone card, and can issue various types of electronic telephone cards.

[0252] According to the invention cited in claim 109, the electronic telephone card issuance request message or the electronic telephone card installation request message includes representative component information describing representative component information to be used for an electronic telephone card that is to be generated.

[0253] Therefore, selected representative component information can be employed when an electronic telephone card is issued, and a high degree of freedom can be exercised in the selection of the type of electronic telephone cards that is to be issued.

[0254] According to the invention cited in claim 110, the electronic wallet generates and then transmits, to the service providing means, a telephone card registration request message requesting that the service providing means register, as an electronic telephone card that is to be used by the owner of the electronic wallet, the electronic telephone card stored in the second storage means for the electronic wallet; the service providing means, upon receiving the telephone card registration request message, newly generates, for the electronic telephone card, a card signature private key, a card signature public key and a registered card certificate for confirming the card signature public key, registers for use the electronic telephone card in the service director information storage means, and then transmits, to the electronic wallet, the card signature private key and the registered card certificate; and the electronic wallet updates the card signature private key and the registered card certificate that are in storage by replacing them with those that have newly been received, and changes the state management information for the electronic telephone card to a usable state.

[0255] Since the signature key for the electronic telephone card is updated for use by the registration, safety is improved.

[0256] According to the invention cited in claim 111, the electronic wallet employs an electronic telephone card, which is selected by input means for the electronic wallet from among those stored in the second storage means, to generate a micro-check message verifying a payment corresponding to an amount entered by the input means, and transmits the micro-check message to the electronic telephone card settlement means.

[0257] Therefore, an electronic telephone card that is to be used can be selected, and usability can be improved.

[0258] According to the invention cited in claim 112, the electronic wallet employs an electronic telephone card, which is selected by input means for the electronic wallet from among those stored in the second storage means, to generate a micro-check call request message requesting a radio communication service in order to communicate with a side that is designated by the input means, and transmits the micro-check

call request message to the electronic telephone card settlement means; the electronic telephone card settlement means, upon receiving the micro-check call request message, generates and then transmits, to the electronic wallet, a micro-check call response message for an amount charged that corresponds to a communication fee; the electronic wallet, upon receiving the micro-check call response message, subtracts the amount charged from the remaining amount stored on the electronic telephone card, and generates and then transmits, to the electronic telephone card settlement means, a telephone micro-check message verifying the payment of an amount corresponding to the amount charged; the electronic telephone card settlement means, upon receiving the telephone micro-check message, generates and then transmits, to the electronic wallet, a receipt message confirming the receipt of the telephone micro-check message; and the electronic wallet stores the received receipt message in the second storage means for the electronic wallet.

[0259] Therefore, the communication service provider can charge an amount that corresponds to a fee for a provided wireless communication service.

[0260] According to the invention cited in claim 113, the electronic telephone card settlement means, when radio wireless communication service is provided, generates and then transmits, to the electronic wallet, a communication fee charge message for an amount charged that corresponds to an additional communication fee; the electronic wallet, upon receiving the communication fee charge message, subtracts the amount that is charged from an amount remaining on the electronic telephone card, and generates and then transmits, to the electronic telephone card settlement means, a new telephone micro-check message verifying payment of the total amount charged; the electronic telephone card settlement means generates and then transmits, to the electronic wallet, a receipt message confirming that the telephone micro-check message has been received; the electronic wallet updates a receipt message stored in the second storage means for the electronic wallet by storing therein the receipt message that is newly received; and the electronic telephone card settlement means, when provision of the radio wireless communication service is terminated, stores the latest telephone micro-check message in the second storage means for the electronic telephone card settlement means.

[0261] Therefore, the amount of history information is not increased very much even though the payment of additional fees is effected many times during the communication process.

[0262] According to the invention cited in claim 114, the micro-check call request message includes:

identification information for the side that is designated by the input means of the electronic wallet;
presented card information and a registered card certificate for the electronic telephone card; and
state management information accompanied by a digital signature that is provided by using a card signature private key.

[0263] Therefore, the contents of the electronic telephone card that are to be used for payments are presented exactly to the electronic telephone card settlement means, so that the electronic telephone card settlement means can determine whether the card is a valid electronic telephone card.

[0264] According to the invention cited in claim 115, the telephone micro-check message includes:

a payment amount;
a amount remaining stored on the electronic telephone card;
identification information for the electronic telephone card settlement means; and
identification information for the owner of the electronic telephone card settlement means. Further, a digital signature is provided for the telephone micro-check message by using the card signature private key of the electronic telephone card.

[0265] As a result, the amount of the payment and the person making the payment are verified, and the imposition of an illegal charge by the owner of the electronic telephone card settlement means can be prevented.

[0266] According to the invention cited in claim 116, not only the digital signature using the card signature private key for the electronic telephone card, but also the digital signature of the owner of the electronic wallet is provided for the telephone micro-check message.

[0267] Since whether or not the telephone micro-check has been issued is determined by the owner of the electronic telephone card, a precise examination of the validity of the telephone micro-check can be performed.

[0268] According to the invention cited in claim 117, the telephone micro-check message includes a telephone micro-check issuing number representing the order in which telephone micro-check messages are generated by the electronic telephone card.

[0269] Since the matching of the generation order for the telephone micro-check and the amount remaining can be determined, a more precise examination of the validity of the telephone micro-check can be performed.

[0270] According to the invention cited in claim 118, at a time designated by the service providing means, the electronic telephone card settlement means generates an upload data message that includes data stored in the second storage means for the electronic telephone card settlement means, and then transmits the upload data message to the service providing means; the service providing means, upon receiving the upload data message, examines the validity of a telephone micro-check that is included in the upload data message by comparing the telephone micro-check with registration information for the electronic telephone card that is registered in the service director information storage means, and generates and then transmits, to the electronic telephone card settlement means, an update data message that includes update data for the second storage means for the electronic telephone card settlement means; and the electronic telephone card settlement means extracts the update data from the update data message that is received, and updates data stored in the second storage means.

[0271] Therefore, the telephone micro-check that has been used can be automatically collected, and an examination of its validity can be performed.

[0272] According to the invention cited in claim 119, a first electronic wallet generates a telephone card transfer offer message offering to transfer, to a second electronic wallet, an electronic telephone card that is stored in the second storage means, and transmits the telephone card transfer offer message via the wireless communication means to the second electronic wallet; the second electronic wallet, upon receiving the telephone card transfer offer message, generates a telephone card transfer offer response message indicating that the contents of the telephone card transfer offer message are accepted, and then transmits the telephone card transfer offer response message via the wireless communication means to the first electronic wallet; and the first electronic wallet, upon receiving the telephone card transfer offer response message, generates and then transmits, to the second electronic wallet, a telephone card transfer certificate message confirming the transfer of the electronic telephone card to the second electronic wallet.

[0273] Therefore, the side that is to transfer the electronic telephone card and the side that is to receive the electronic telephone card can negotiate the provisions of the transfer.

[0274] According to the invention cited in claim 120, the telephone card transfer offer message includes:

presented card information and a card certificate or a registered card certificate for the electronic telephone card; and
state management information accompanied by a digital signature added by using a card signature private key.

[0275] Thus, the side to which the electronic telephone card is to be transferred can confirm its contents in advance.

[0276] According to the invention cited in claim 121, the telephone card transfer offer message includes a public key certificate for the owner of the first electronic wallet; the digital signature of the owner of the first electronic wallet is provided for the telephone card transfer offer message; the telephone card transfer offer response message includes a public key certificate for the owner of the second electronic wallet; the digital signature of the owner of the second electronic wallet is provided for the telephone card transfer offer message; the telephone card transfer certificate message includes identification information for the public key certificate for the owner of the first electronic wallet and identification information for the public key certificate for the owner of the second electronic wallet; and a digital signature using a card signature

private key for the electronic telephone card and the digital signature of the owner of the first electronic wallet are provided for the telephone card transfer certificate message. Thus, the person to whom the electronic telephone card is to be transferred is identified, and even if the telephone card transfer certificate is stolen, the unauthorized use of that card can be prevented.

[0277] According to the invention cited in claim 122, identification information that describes a payment method selected by the input means of the electronic wallet is included in the ticket application message issued by the electronic wallet when requesting the purchase of an electronic ticket.

[0278] Therefore, the payment method can be selected when an electronic ticket is purchased, and usability is improved.

[0279] According to the invention cited in claim 123, the electronic ticket issuance request message or the electronic ticket installation request message includes template program identification information for designating, following the order that is to be used for the generation of electronic tickets, one of a plurality of template programs that are stored in the ticket issuer information storage means.

[0280] Therefore, the ticket issuing means can designate a template program to be used for the electronic ticket, and can issue various types of electronic tickets.

[0281] According to the invention cited in claim 124, the electronic ticket issuance request message or the electronic ticket installation request message includes representative component information describing representative component information for an electronic ticket that is to be generated.

[0282] Therefore, selected representative component information can be employed when an electronic ticket is issued, and a high degree of freedom can be exercised in the selection of the type of electronic ticket that is to be issued.

[0283] According to the invention cited in claim 125, the electronic wallet generates and then transmits, to the service providing means, a ticket registration request message requesting that the service providing means register, as an electronic ticket that is to be used by the owner of the electronic wallet the electronic ticket stored in the second storage means for the electronic wallet; the service providing means, upon receiving the ticket registration request message, newly generates, for the electronic ticket, a ticket signature private key, a ticket signature public key and a registered ticket certificate for verifying the ticket signature public key, registers the electronic ticket for use in the service director information storage means, and then transmits, to the electronic wallet, the ticket signature private key and the registered ticket certificate; and the electronic wallet updates the ticket signature private key and the registered ticket certificate that are stored by replacing them with those that have been newly received, and changes the state management information for the electronic ticket to a usable state.

[0284] Since for use the signature key for the electronic ticket is updated by the registration, safety is improved.

[0285] According to the invention cited in claim 126, the electronic wallet generates a ticket presenting message in which is designated an electronic ticket that is selected, from among those stored in the second storage means, by input means for the electronic wallet, and transmits the ticket presenting message to the electronic ticket examination means.

[0286] Therefore, an electronic ticket that is to be used can be selected, and usability can be improved.

[0287] According to the invention cited in claim 127, the electronic ticket examination means, upon receiving the ticket presenting message, generates and then transmits, to the electronic wallet, a ticket examination message instructing the modification of the electronic ticket to a post-examined state; the electronic wallet, upon receiving the ticket examination message, changes the electronic ticket to the post-examined state, and generates and then transmits, to the electronic ticket examination means, a ticket examination response message that describes the contents of the modified electronic ticket; the electronic ticket examination means stores the received ticket examination response message in the second storage means for the electronic ticket examination means, and generates and then transmits, to the electronic wallet, an examination certificate message certifying that the electronic ticket has been examined; and the electronic wallet stores the received examination certificate message in the second storage means for the electronic wallet. Therefore, the electronic ticket examination means can perform the examination process

in consonance with the contents of the ticket that is presented.

[0288] According to the invention cited in claim 128, the ticket presenting message includes:

presented ticket information and a registered ticket certificate for the electronic ticket; and
state management information accompanied by a digital signature provided by using a ticket signature private key.

[0289] Therefore, the contents of the electronic ticket to be used for payment are precisely presented to the electronic ticket examination means, so that the electronic ticket examination means can determine whether the ticket is a valid electronic ticket.

[0290] According to the invention cited in claim 129, the ticket examination response message includes:

state management information for the electronic ticket;
identification information for the electronic ticket examination means; and
identification information for the owner of the electronic ticket examination means. Further, a digital signature is provided for the ticket examination response message by using the ticket signature private key for the electronic ticket.

[0291] As a result, the contents of the electronic ticket that is examined are verified, and an illegal charge imposed by the owner of the electronic ticket examination means can be prevented.

[0292] According to the invention cited in claim 130, the ticket examination response message includes identification information for the electronic ticket examination means and identification information for the owner of the electronic ticket examination means. Further, the digital signature prepared using the ticket signature private key for the electronic ticket and the digital signature of the owner of the electronic wallet are provided for the ticket examination response message.

[0293] Since it can be determined whether or not the ticket examination response message has been issued by the owner of the electronic ticket, a precise examination of the validity of the ticket examination response can be performed.

[0294] According to the invention cited in claim 131, the ticket examination response message includes a ticket examination number representing the order in which ticket examination response messages are generated by the electronic ticket.

[0295] Since the matching of the generation order for the ticket examination response message and the remaining amount can be determined, a more precise examination of the validity of the ticket examination response message can be performed.

[0296] According to the invention cited in claim 132, at a time designated by the service providing means, the electronic ticket examination means generates an upload data message that includes data stored in the second storage means for the electronic ticket examination means, and then transmits the upload data message to the service providing means; the service providing means, upon receiving the upload data message, determines the validity of a ticket examination response that is included in the upload data message by comparing the ticket examination response with registration information for the electronic ticket that is registered in the service director information storage means, and generates and then transmits, to the electronic ticket examination means, an update data message that includes update data for the second storage means for the electronic ticket examination means; the electronic ticket examination means extracts the update data from the update data message that is received, and updates data stored in the second storage means.

[0297] Therefore, the ticket examination response can be automatically compiled, and its validity can be examined.

[0298] According to the invention cited in claim 133, a first electronic wallet generates a ticket transfer offer message offering to transfer, to a second electronic wallet, an electronic ticket that is stored in the second storage means, and then transmits the ticket transfer offer message,via the wireless communication means

to the second electronic wallet; the second electronic wallet, upon receiving the ticket transfer offer message, generates a ticket transfer offer response message indicating the contents of the ticket transfer offer message are acceptable, and then transmits the ticket transfer offer response message via the wireless communication means to the first electronic wallet; and the first electronic wallet, upon receiving the ticket transfer offer response message, generates and then transmits, to the second electronic wallet, a ticket transfer certificate message confirming the transfer of the electronic ticket to the second electronic wallet. Therefore, the side that is to transfer the electronic ticket and the side that is to receive the electronic ticket can perform negotiations concerning the contents.

[0299] According to the invention cited in claim 134, the ticket transfer offer message includes:

presented ticket information and a ticket certificate or a registered ticket certificate for the electronic ticket; and
state management information accompanied by a digital signature that is added by using a ticket signature private key.

[0300] Thus, the side to which the electronic ticket is to be transferred can confirm the ticket contents in advance.

[0301] According to the invention cited in claim 135, the ticket transfer offer message includes a public key certificate for the owner of the first electronic wallet; the digital signature of the owner of the first electronic wallet is provided for the ticket transfer offer message; the ticket transfer offer response message includes a public key certificate for the owner of the second electronic wallet; the digital signature of the owner of the second electronic wallet is provided for the ticket transfer offer message; the ticket transfer certificate message includes identification information for the public key certificate for the owner of the first electronic wallet and identification information for the public key certificate for the owner of the second electronic wallet; and a digital signature using a ticket signature private key for the electronic ticket and the digital signature of the owner of the first electronic wallet are provided for the ticket transfer certificate message.

[0302] Thus, the person to whom the electronic ticket is to be transferred is verified, and even if the ticket transfer certificate is stolen, the unauthorized use of that ticket can be prevented.

[0303] According to the invention cited in claim 136, settlement option information for deciding which procedures to use for settlement is included in the electronic payment card issuance request message, in the electronic telephone card issuance request message or in the electronic ticket issuance request message.

[0304] Thus, the payment card issuer, the telephone card issuer and the ticket issuer can establish procedures to be used for the settlement.

[0305] According to the invention cited in claim 137, the service providing means, upon receiving the electronic payment card issuance request message, the electronic telephone card issuance request message or the electronic ticket issuance request message, generates and then transmits, to the electronic wallet, an electronic payment card, an electronic telephone card or an electronic ticket before performing a price settlement in accordance with the settlement option information.

[0306] Thus, the electronic payment card, the electronic telephone card or the electronic ticket can be issued without the purchaser being delayed.

[0307] According to the invention cited in claim 138, the service providing means, upon receiving the electronic payment card issuance request message, the electronic telephone card issuance request message or the electronic ticket issuance request message, generates and then transmits, to the electronic wallet, an electronic payment card, an electronic telephone card or an electronic ticket, and a temporary receipt message describing the contents of a settlement before performing a price settlement in accordance with the settlement option information.

[0308] Thus, the electronic payment card, the electronic telephone card or the electronic ticket can be issued without the purchaser being delayed.

[0309] According to the invention cited in claim 139, data concerning the electronic payment card, the

electronic telephone card and the electronic ticket belonging to the owner of the electronic wallet, and data processed by the central processing unit of the electronic wallet are stored in the second storage means for the electronic wallet or in the user information storage means for the service providing means; the data are managed by describing, in the second storage means for the electronic wallet, identification information for the data, and addresses of the data in the corresponding storage means; when data at an address in the user information storage means are to be processed, the electronic wallet generates and then transmits, to the service providing means, a remote access request message requesting address data; the service providing means, upon receiving the remote access request message, generates and then transmits, to the electronic wallet, a remote access data message in which the requested data are included; and the electronic wallet, upon receiving the remote access data message, extracts the requested data from the message.

[0310] Therefore, a plurality of electronic payment cards, electronic telephone cards and electronic tickets, and multiple sets of history information can be managed for the electronic, even in a memory having only a limited capacity.

[0311] According to the invention cited in claim 140, the electronic wallet employs a ferroelectric nonvolatile memory as storage means.

[0312] Therefore, the service life of the battery of the electronic wallet can be extended.

[0313] According to the invention cited in claim 141, a ferroelectric nonvolatile memory is employed as storage means for the electronic payment card settlement means.

[0314] Therefore, the service life of the battery for the electronic payment card settlement means can be extended.

[0315] According to the invention cited in claim 142, the object is one whereon or wherein electronic payment card installation information, electronic telephone card installation information, or electronic ticket installation information is printed or engraved in a form readable by a person or reading means.

[0316] Therefore, the electronic payment card, the electronic telephone card or the electronic ticket can be physically distributed along a distribution route.

[0317] According to the invention cited in claim 143, a coating is applied to a portion of the object whereon or wherein the electronic payment card installation information, the electronic telephone card installation information or the electronic ticket installation information is printed or engraved in order to disable the reading of the electronic payment card installation information, the electronic telephone card installation information or the electronic ticket installation information. The coating is removable.

[0318] Thus, the unauthorized dissemination of installation information occurring prior to a purchase can be prevented.

[0319] According to the invention cited in claim 144, to prevent holographic counterfeiting, a micro-character or a micro-pattern is printed on or etched in the object.

[0320] Therefore, the counterfeiting can be prevented.

[0321] According to the invention cited in claim 145, on the recording medium, electronic payment card installation information, electronic telephone card installation information, or electronic ticket installation information is recorded using a form that can be read by recording/reproduction means.

[0322] Therefore, the electronic payment card, the electronic telephone card or the electronic ticket can be physically distributed along a distribution route.

[0323] According to the invention cited in claim 146, on the recording medium, a control program for the central processing unit of the electronic wallet cited in one of claims 28 to 139 is stored in a form readable by a computer. Thus, the program can be distributed in a portable form.

[0324] According to the invention cited in claim 147, on the recording medium, a control program for the central processing unit of the electronic payment card settlement means cited in one of claims 29 to 139 is

recorded in a form readable by a computer. Thus, the program can be distributed in a portable form.

[0325] According to the invention cited in claim 148, on the recording medium, a control program for the central processing unit of the electronic telephone card settlement means cited in one of claims 32 to 139 is recorded in a form readable by a computer. Thus, the program can be distributed in a portable form.

[0326] According to the invention cited in claim 149, on the recording medium, a control program for the central processing unit of the electronic ticket examination means cited in one of claims 33 to 139 is recorded in a form readable by a computer. Thus, the program can be distributed in a portable form.

[0327] According to the invention cited in claim 150, on the recording medium, a processing program for the computer system of the service providing means cited in one of claims 34 to 139 is recorded in a form readable by a computer. Thus, the program can be distributed in a portable form.

[0328] According to the invention cited in claim 151, on the recording medium, a processing program for the computer system of the settlement processing means cited in one of claims 35 to 139 is recorded in a form readable by a computer. Thus, the program can be distributed in a portable form.

[0329] According to the invention cited in claim 152, on the recording medium, a processing program for the computer system of the payment card issuing means cited in one of claims 36 to 139 is recorded in a form readable by a computer. Thus, the program can be distributed in a portable form.

[0330] According to the invention cited in claim 153, on the recording medium, a processing program for the computer system of the telephone card issuing means cited in one of claims 37 to 139 is recorded in a form readable by a computer. Thus, the program can be distributed in a portable form.

[0331] According to the invention cited in claim 154, on the recording medium, a processing program for the computer system of the ticket issuing means cited in one of claims 38 to 139 is recorded in a form readable by a computer. Thus, the program can be distributed in a portable form.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a block diagram illustrating the arrangement of a mobile electronic commerce system according to one embodiment of the present invention;
Fig. 2A is a diagram for explaining a transfer function according to the embodiment of the present invention;

Fig. 2B is a diagram for explaining the function of an installed card according to the embodiment of the present invention;
Fig. 3A is a schematic front view of a mobile user terminal in a credit card mode according to the embodiment of the present invention;
Fig. 3B is a schematic rear view of a mobile user terminal in a credit card mode according to the embodiment of the present invention;
Fig. 3C is a schematic front view of a mobile user terminal in a ticket mode according to the embodiment of the present invention;
Fig. 3D is a schematic front view of a mobile user terminal in a payment card mode according to the embodiment of the present invention;
Fig. 3E is a schematic front view of a mobile user terminal in a telephone card mode according to the embodiment of the present invention;
Fig. 3F is a schematic front view of a mobile user terminal in the ticket mode according to a modification of the embodiment of the present invention;
Fig. 3G is a schematic front view of a mobile user terminal in the payment card mode according to a modification of the embodiment of the present invention;
Fig. 3H is a schematic front view of a mobile user terminal in the telephone card mode according to a modification of the embodiment of the present invention;
Fig. 4 is a schematic diagram illustrating a gate terminal according to the embodiment of the present invention;
Fig. 5 is a schematic diagram illustrating a merchant terminal according to the embodiment of the present

invention;
Figs. 6A and 6B are schematic diagrams showing merchant terminals (digital wireless telephone type) according to the embodiment of the present invention;
Fig. 7 is a schematic diagram illustrating an automatic vending machine according to the embodiment of the present invention;
Fig. 8 is a block diagram illustrating the arrangement of a switching center according to the embodiment of the present invention;
Fig. 9 is a block diagram illustrating the arrangement of a service system according to the embodiment of the present invention;
Fig. 10 is a block diagram illustrating a settlement system according to the present invention;
Fig. 11 is a block diagram illustrating a ticket issuing system according to the present invention;
Fig. 12 is a block diagram illustrating a payment card issuing system according to the present invention;
Fig. 13 is a block diagram illustrating a telephone card issuing system according to the present invention;
Figs. 14A and 14B are schematic diagrams illustrating an electronic payment card installation card according to the embodiment of the present invention;
Figs. 14C and 14D are schematic diagrams illustrating an electronic telephone card installation card according to the embodiment of the present invention;
Figs. 14E and 14F are schematic diagrams illustrating an electronic ticket installation card according to the embodiment of the present invention;
Fig. 15 is a block diagram illustrating the arrangement of a mobile user terminal according to the embodiment of the present invention;
Fig. 16A is a diagram illustrating the arrangement of an internal register in the mobile user terminal according to the embodiment of the present invention;
Fig. 16B is a diagram showing the bit field structure of an interrupt register in the mobile user terminal according to the embodiment of the present invention;
Fig. 17 is a specific diagram showing a RAM map for the mobile user terminal according to the embodiment of the present invention;
Fig. 18 is a specific diagram showing data that are stored in the service data area of the mobile user terminal according to the embodiment of the present invention;
Fig. 19 is a specific diagram showing the data structure of an electronic ticket according to the embodiment of the present invention;
Fig. 20 is a specific diagram showing the data structure of an electronic payment card according to the embodiment of the present invention;
Fig. 21 is a specific diagram showing the data structure of an electronic telephone card according to the embodiment of the present invention;
Fig. 22 is a block diagram illustrating the arrangement of a gate terminal according to the embodiment of the present invention;
Fig. 23A is a diagram illustrating the arrangement of an internal register in the gate terminal according to the embodiment of the present invention;
Fig. 23B is a diagram showing the bit field structure of an interrupt register in the gate terminal according to the embodiment of the present invention;
Fig. 24 is a specific diagram showing a RAM map for the gate terminal according to the embodiment of the present invention;
Fig. 25 is a specific diagram showing data that are stored in the service data area of the gate terminal according to the embodiment of the present invention;
Fig. 26 is a block diagram illustrating the arrangement of a merchant terminal according to the embodiment of the present invention;
Fig. 27A is a diagram illustrating the arrangement of an internal register in the merchant terminal according to the embodiment of the present invention;
Fig. 27B is a diagram showing the bit field structure of an interrupt register in the merchant terminal according to the embodiment of the present invention;
Fig. 28 is a specific diagram showing a RAM map for the merchant terminal according to the embodiment of the present invention;
Fig. 29 is a specific diagram showing data that are stored in the service data area of the merchant terminal according to the embodiment of the present invention;
Fig. 30 is a block diagram illustrating the arrangement of a merchant terminal (digital wireless telephone type) according to the embodiment of the present invention;
Fig. 31A is a diagram illustrating the arrangement of an internal register in the merchant terminal (digital wireless telephone type) according to the embodiment of the present invention;
Fig. 31B is a diagram showing the bit field structure of an interrupt register in the merchant terminal (digital wireless telephone type) according to the embodiment of the present invention;

Fig. 31C is a diagram showing the bit field structure of a key display register in the merchant terminal (digital wireless telephone type) according to the embodiment of the present invention;
Fig. 32 is a specific diagram showing a RAM map for the merchant terminal (digital wireless telephone type) according to the embodiment of the present invention;
Fig. 33 is a specific diagram showing data that are stored in the service data area of the merchant terminal (digital wireless telephone type) according to the embodiment of the present invention;
Fig. 34 is a block diagram illustrating the arrangement of an automatic vending machine according to the embodiment of the present invention;
Fig. 35A is a diagram illustrating the arrangement of an internal register in the automatic vending machine according to the embodiment of the present invention;
Fig. 35B is a diagram showing the bit field structure of an interrupt register in the automatic vending machine according to the embodiment of the present invention;
Fig. 36 is a specific diagram showing a RAM map for the accounting device according to the embodiment of the present invention;
Fig. 37 is a specific diagram showing data that are stored in the service data area of the accounting device according to the embodiment of the present invention;
Fig. 38 is a block diagram illustrating the arrangement of an electronic telephone card automatic vending machine according to the embodiment of the present invention;
Fig. 39 is a specific diagram showing a RAM map for the electronic telephone card accounting device according to the embodiment of the present invention;
Fig. 40 is a specific diagram showing data that are stored in the service data area of the electronic telephone card accounting device according to the embodiment of the present invention;
Fig. 41A is a flowchart showing the digital signature processing according to the embodiment of the present invention;
Fig. 41B is a flowchart showing the digital signature processing according to the embodiment of the present invention;
Fig. 42A is a flowchart showing the message sealing processing according to the embodiment of the present invention;
Fig. 42B is a flowchart showing the message sealing processing according to the embodiment of the present invention;
Fig. 43A is a flowchart showing the closed message decryption processing according to the embodiment of the present invention;
Fig. 43B is a flowchart showing the closed message decryption processing according to the embodiment of the present invention;
Fig. 44A is a flowchart showing the digital signature authentication processing according to the embodiment of the present invention;
Fig. 44B is a flowchart showing the digital signature authentication processing according to the embodiment of the present invention;
Fig. 45 is a diagram for explaining the processing architecture of the service system according to the embodiment of the present invention;
Fig. 46 is a specific diagram showing data that are stored for each user in the user information server of the service system according to the embodiment of the present invention;
Fig. 47 is a specific diagram showing data that are stored in the merchant information server of the service system for one gate terminal, merchant terminals 102 and 103, the accounting device, and the electronic telephone card accounting device;
Fig. 48 is a specific diagram showing data, for each transaction processor, that are stored in the transaction processor information server of the service system according to the embodiment of the present invention;
Fig. 49 is a specific diagram showing data, for each ticket issuer, that are stored in the ticket issuer information server of the service system according to the embodiment of the present invention;
Fig. 50 is a specific diagram showing data, for each payment card issuer, that are stored in the payment card issuer information server of the service system according to the embodiment of the present invention;
Fig. 51 is a specific diagram showing data, for each telephone card issuer, that are stored in the telephone card issuer information server of the service system according to the embodiment of the present invention;
Figs. 52A to 52G are specific diagrams showing a user list, a merchant list, a transaction processor list, a ticket issuer list, a payment card issuer list, a telephone card issuer list and a provided service list, all of which are stored in the service director information server of the service system according to the embodiment of the present invention;
Fig. 53 is a specific diagram showing data, for each electronic ticket, that are stored in the service director information server of the service system according to the embodiment of the present invention;
Fig. 54 is a specific diagram showing data, for each electronic payment card, that are stored in the service director information server of the service system according to the embodiment of the present invention;

Fig. 55 is a specific diagram showing data, for each electronic telephone card, that are stored in the service director information server of the service system according to the embodiment of the present invention;
Fig. 56A is a flowchart showing a remote access process performed by the mobile user terminal and the user processor according to the embodiment of the present invention;
Fig. 56B is a flowchart showing a data update process performed by the mobile user terminal and the user processor according to the embodiment of the present invention;
Fig. 56C is a flowchart showing a forcible data update process performed by the mobile user terminal and the user processor according to the embodiment of the present invention;
Fig. 56D is a flowchart showing a data backup process performed by the mobile user terminal and the user processor according to the embodiment of the present invention;
Fig. 57A is a flowchart showing a remote access process performed by the gate terminal (or the merchant terminal 102 or 103, the accounting device, or the electronic telephone card accounting device) and the merchant processor;
Fig. 57B is a flowchart showing a data update process performed by the gate terminal (or the merchant terminal 102 or 103, the accounting device, or the electronic telephone card accounting device) and the merchant processor;
Fig. 57C is a flowchart showing a forcible data update process performed by the gate terminal (or the merchant terminal 102 or 103, the accounting device, or the electronic telephone card accounting device) and the merchant processor;
Fig. 57D is a flowchart showing a data backup process performed by the gate terminal (or the merchant terminal 102 or 103, the accounting device, or the electronic telephone card accounting device) and the merchant processor;
Fig. 58 is a flowchart showing ticket order processing according to the embodiment of the present invention;

Fig. 59 is a flowchart showing ticket purchase processing (spontaneous settlement) according to the embodiment of the present invention;
Fig. 60 is a flowchart showing ticket purchase processing (delayed settlement) according to the embodiment of the present invention;
Fig. 61 is a flowchart showing payment card purchase processing (spontaneous settlement) according to the embodiment of the present invention;
Fig. 62 is a flowchart showing payment card purchase processing (delayed settlement) according to the embodiment of the present invention;
Fig. 63 is a flowchart showing telephone card purchase processing (spontaneous settlement) according to the embodiment of the present invention;
Fig. 64 is a flowchart showing telephone card purchase processing (delayed settlement) according to the embodiment of the present invention;
Fig. 65A is a flowchart showing ticket registration processing according to the embodiment of the present invention;
Fig. 65B is a flowchart showing payment card registration processing according to the embodiment of the present invention;
Fig. 65C is a flowchart showing the telephone card registration processing according to the embodiment of the present invention;
Fig. 66 is a flowchart showing ticket setup processing according to the embodiment of the present invention;
Fig. 67 is a flowchart showing ticket examination processing according to the embodiment of the present invention;
Fig. 68 is a flowchart showing payment card settlement processing performed by the mobile user terminal and the merchant terminal 102 (or the merchant terminal 103) according to the embodiment of the present invention;
Fig. 69 is a flowchart showing payment card settlement processing performed by the mobile user terminal and the automatic vending machine according to the embodiment of the present invention;
Fig. 70 is a flowchart showing telephone card settlement processing according to the embodiment of the present invention;
Fig. 71 is a flowchart showing ticket reference processing according to the embodiment of the present invention;
Fig. 72 is a flowchart showing payment card reference processing according to the embodiment of the present invention;
Fig. 73 is a flowchart showing telephone card reference processing according to the embodiment of the present invention;
Fig. 74 is a flowchart showing ticket transfer processing according to the embodiment of the present invention;

Fig. 75 is a flowchart showing payment card transfer processing according to the embodiment of the present invention;
Fig. 76 is a flowchart showing telephone card transfer processing according to the embodiment of the present invention;
Fig. 77 is a flowchart showing electronic ticket installation processing according to the embodiment of the present invention;
Fig. 78 is a flowchart showing electronic payment card installation processing according to the embodiment of the present invention;
Fig. 79 is a flowchart showing electronic telephone card installation processing according to the embodiment of the present invention;
Fig. 80 is a flowchart showing ticket modification processing for the gate terminal according to the embodiment of the present invention;
Fig. 81 is a flowchart showing ticket modification processing for the mobile user terminal according to the embodiment of the present invention;
Fig. 82 is a flowchart showing ticket refund processing (spontaneous settlement) according to the embodiment of the present invention;
Fig. 83 is a flowchart showing ticket refund processing (delayed settlement) according to the embodiment of the present invention;
Fig. 84 is a flowchart showing real credit settlement processing according to the embodiment of the present invention;
Fig. 85A is a specific diagram showing the data structure of a remote access request that is exchanged between the mobile user terminal and the gate terminal according to the embodiment of the present invention;
Fig. 85B is a specific diagram showing the structure of remote access data that are exchanged between the mobile user terminal and the user processor according to the embodiment of the present invention;
Fig. 86A is a specific diagram showing the data structure of a remote access request that is exchanged between the gate terminal (or the merchant terminal 102 or 103) and the merchant processor according to the embodiment of the present invention;
Fig. 86B is a specific diagram showing the structure of remote access data that are exchanged between the gate terminal (or the merchant terminal 102 or 103) and the merchant processor according to the embodiment of the present invention;
Fig. 87A is a specific diagram showing the data structure of a data update request that is exchanged between the mobile user terminal and the user processor according to the embodiment of the present invention;
Fig. 87B is a specific diagram showing the data structure of a data update response that is exchanged between the mobile user terminal and the user processor according to the embodiment of the present invention;
Fig. 87C is a specific diagram showing the structure of upload data that are exchanged between the mobile user terminal and the user processor according to the embodiment of the present invention;
Fig. 87D is a specific diagram showing the structure of update data that are exchanged between the mobile user terminal and the user processor according to the embodiment of the present invention;
Fig. 87E is a specific diagram showing the data structure of a mandatory expiration that is exchanged between the mobile user terminal and the user processor according to the embodiment of the present invention;
Fig. 87F is a specific diagram showing the data structure of a data update instruction that is exchanged between the mobile user terminal and the user processor according to the embodiment of the present invention;
Fig. 88A is a specific diagram showing the data structure of a data update request that is exchanged between the gate terminal (the merchant terminal 102 or 103, the accounting device, or the electronic telephone accounting device) and the merchant processor according to the embodiment of the present invention;
Fig. 88B is a specific diagram showing the data structure of a data update response that is exchanged between the gate terminal (the merchant terminal 102 or 103, the accounting device, or the electronic telephone card accounting device) and the merchant processor according to the embodiment of the present invention;
Fig. 88C is a specific diagram showing the structure of upload data that are exchanged between the gate terminal (the merchant terminal 102 or 103, the accounting device, or the electronic telephone accounting device) and the merchant processor according to the embodiment of the present invention;
Fig. 88D is a specific diagram showing the structure of update data that are exchanged between the gate terminal (the merchant terminal 102 or 103, the accounting device, or the electronic telephone card accounting device) and the merchant processor according to the embodiment of the present invention;

Fig. 88E is a specific diagram showing the data structure of a mandatory expiration that is exchanged between the gate terminal (the merchant terminal 102 or 103, the accounting device, or the electronic telephone accounting device) and the merchant processor according to the embodiment of the present invention;
Fig. 88F is a specific diagram showing the data structure of a data update instruction that is exchanged between the gate terminal (the merchant terminal 102 or 103, the accounting device, or the electronic telephone card accounting device) and the merchant processor according to the embodiment of the present invention;
Fig. 89A is a specific diagram showing the data structure of a ticket order that is transmitted, during the ticket order processing, from the mobile user terminal to the service system according to the embodiment of the present invention;
Fig. 89B is a specific diagram showing the data structure of a ticket order that is transmitted, during the ticket order processing, from the service system to the ticket issuing system according to the embodiment of the present invention;
Fig. 90A is a specific diagram showing the data structure of a ticket order response that is transmitted, during the ticket order processing, from the ticket issuing system to the service system according to the embodiment of the present invention;
Fig. 90B is a specific diagram showing the data structure of a ticket order response that is transmitted, during the ticket order processing, from the service system to the mobile user terminal according to the embodiment of the present invention;
Fig. 91A is a specific diagram showing the data structure of a ticket purchase order that is transmitted, during the ticket purchase processing, from the mobile user terminal to the service system according to the embodiment of the present invention;
Fig. 91B is a specific diagram showing the data structure of a ticket purchase order that is transmitted, during the ticket purchase processing, from the service system to the ticket issuing system according to the embodiment of the present invention;
Fig. 92A is a specific diagram showing the data structure of an electronic ticket issuing commission for the ticket purchase processing according to the embodiment of the present invention;
Fig. 92B is a specific diagram showing the data structure for an electronic ticket issuing in the ticket purchase processing according to the embodiment of the present invention;
Fig. 93A is a specific diagram showing the data structure of a temporary receipt for the ticket purchase processing according to the embodiment of the present invention;
Fig. 93B is a specific diagram showing the data structure of a clearing request in the ticket purchase processing according to the embodiment of the present invention;
Fig. 94A is a specific diagram showing the data structure of a clearing completion notification that is transmitted, in the ticket purchase processing, from the settlement system to the service system according to the embodiment of the present invention;
Fig. 94B is a specific diagram showing the data structure of a clearing completion notification that is transmitted, in the ticket purchase processing, from the service system to the ticket issuing system according to the embodiment of the present invention;
Fig. 95A is a specific diagram showing the data structure of a receipt that is transmitted, in the ticket purchase processing, from the ticket issuing system to the service system according to the embodiment of the present invention;
Fig. 95B is a specific diagram showing the data structure of a receipt that is transmitted, in the ticket purchase processing, from the service system to the mobile user terminal according to the embodiment of the present invention;
Fig. 96A is a specific diagram showing the data structure of a payment card purchase order that is transmitted from the mobile user terminal to the service system according to the embodiment of the present invention;
Fig. 96B is a specific diagram showing the data structure of a payment card purchase order that is transmitted, during the payment card purchase processing, from the service system to the payment card issuing system according to the embodiment of the present invention;
Fig. 97A is a specific diagram showing the data structure of an electronic payment card issuing commission for the payment card purchase processing according to the embodiment of the present invention;
Fig. 97B is a specific diagram showing the data structure of electronic payment card issuing data for the payment card purchase processing according to the embodiment of the present invention;
Fig. 98A is a specific diagram showing the data structure of a temporary receipt for the payment card purchase processing according to the embodiment of the present invention;
Fig. 98B is a specific diagram showing the data structure of a clearing request in the payment card purchase processing according to the embodiment of the present invention;
Fig. 99A is a specific diagram showing the data structure of a clearing completion notification that is

transmitted, in the payment card purchase processing, from the settlement system to the service system according to the embodiment of the present invention;
Fig. 99B is a specific diagram showing the data structure of a clearing completion notification that is transmitted, in the payment card purchase processing, from the service system to the payment card issuing system according to the embodiment of the present invention;
Fig. 100A is a specific diagram showing the data structure of a receipt that is transmitted, in the payment card purchase processing, from the payment card issuing system to the service system according to the embodiment of the present invention;
Fig. 100B is a specific diagram showing the data structure of a receipt that is transmitted, in the payment card purchase processing, from the service system to the mobile user terminal according to the embodiment of the present invention;
Fig. 101A is a specific diagram showing the data structure of a telephone card purchase order that is transmitted from the mobile user terminal to the service system according to the embodiment of the present invention;
Fig. 101B is a specific diagram showing the data structure of a telephone card purchase order that is transmitted, during the payment card purchase processing, from the service system to the telephone card issuing system according to the embodiment of the present invention;
Fig. 102A is a specific diagram showing the data structure of an electronic telephone card issuing commission for the telephone card purchase processing according to the embodiment of the present invention;
Fig. 103B is a specific diagram showing the data structure of an electronic telephone issuing in the telephone card purchase processing according to the embodiment of the present invention;
Fig. 104A is a specific diagram showing the data structure of a temporary receipt for the telephone card purchase processing according to the embodiment of the present invention;
Fig. 103B is a specific diagram showing the data structure of a clearing request in the telephone card purchase processing according to the embodiment of the present invention;
Fig. 105A is a specific diagram showing the data structure of a clearing completion notification that is transmitted, in the telephone card purchase processing, from the settlement system to the service system according to the embodiment of the present invention;
Fig. 104B is a specific diagram showing the data structure of a clearing completion notification that is transmitted, in the telephone card purchase processing, from the service system to the telephone card issuing system according to the embodiment of the present invention;
Fig. 106A is a specific diagram showing the data structure of a receipt that is transmitted, in the telephone card purchase processing, from the telephone card issuing system to the service system according to the embodiment of the present invention;
Fig. 105B is a specific diagram showing the data structure of a receipt that is transmitted, in the telephone card purchase processing, from the service system to the mobile user terminal according to the embodiment of the present invention;
Fig. 107A is a specific diagram showing the data structure of a ticket registration request for the ticket registration processing according to the embodiment of the present invention;
Fig. 106B is a specific diagram showing the data structure of a ticket certificate issuing in the ticket registration processing according to the embodiment of the present invention;
Fig. 108A is a specific diagram showing the data structure of a payment card registration request for the payment card registration processing according to the embodiment of the present invention;
Fig. 107B is a specific diagram showing the data structure of payment card certificate issuing in the payment card registration processing according to the embodiment of the present invention;
Fig. 109A is a specific diagram showing the data structure of a telephone card registration request for the telephone card registration processing according to the embodiment of the present invention;
Fig. 108B is a specific diagram showing the data structure of telephone card certificate issuing in the telephone card registration processing according to the embodiment of the present invention;
Fig. 110A is a specific diagram showing the data structure of an examination object ticket request for the ticket setup processing according to the embodiment of the present invention;
Fig. 109B is a specific diagram showing the data structure of an examination object ticket for the ticket setup processing according to the embodiment of the present invention;
Fig. 111A is a specific diagram showing the data structure of a ticket presentation for the ticket examination processing according to the embodiment of the present invention;
Fig. 110B is a specific diagram showing the structure of ticket examination data for the ticket examination processing according to the embodiment of the present invention;
Fig. 112A is a specific diagram showing the data structure of a ticket examination response for the ticket examination processing according to the embodiment of the present invention;
Fig. 111B is a specific diagram showing the data structure of an examination certificate for the ticket

examination processing according to the embodiment of the present invention;
Fig. 113A is a specific diagram showing the data structure of a payment offer for the payment card settlement processing according to the embodiment of the present invention;
Fig. 112B is a specific diagram showing the data structure of a payment offer response for the payment card settlement processing according to the embodiment of the present invention;
Fig. 114A is a specific diagram showing the data structure of a micro-check for the payment card settlement processing according to the embodiment of the present invention;
Fig. 113B is a specific diagram showing the data structure of a receipt for the payment card settlement processing according to the embodiment of the present invention;
Fig. 115A is a specific diagram showing the data structure of a micro-check call request for the telephone card settlement processing according to the embodiment of the present invention;
Fig. 114B is a specific diagram showing the data structure of a micro-check call response for the telephone card settlement processing according to the embodiment of the present invention;
Fig. 116A is a specific diagram showing the data structure of a telephone micro-check for the telephone card settlement processing according to the embodiment of the present invention;
Fig. 115B is a specific diagram showing the data structure of a receipt for the telephone card settlement processing according to the embodiment of the present invention;
Fig. 115C is a specific diagram showing the data structure of a communication charge for the telephone card settlement processing according to the embodiment of the present invention;
Fig. 117A is a specific diagram showing the data structure of a usage report for the ticket reference processing according to the embodiment of the present invention;
Fig. 116B is a specific diagram showing the data structure of a usage report for the payment card reference processing according to the embodiment of the present invention;
Fig. 116C is a specific diagram showing the data structure of a usage report for the telephone card reference processing according to the embodiment of the present invention;
Fig. 118A is a specific diagram showing the data structure of a ticket transfer offer for the ticket transfer processing according to the embodiment of the present invention;
Fig. 117B is a specific diagram showing the data structure of a ticket transfer offer response for the ticket transfer processing according to the embodiment of the present invention;
Fig. 119A is a specific diagram showing the data structure of a ticket transfer certificate for the ticket transfer processing according to the embodiment of the present invention;
Fig. 118B is a specific diagram showing the data structure of a ticket transfer receipt for the ticket transfer processing according to the embodiment of the present invention;
Fig. 120A is a specific diagram showing the data structure of a ticket transfer request for the ticket transfer processing according to the embodiment of the present invention;
Fig. 119B is a specific diagram showing the data structure of a ticket transfer for the ticket transfer processing according to the embodiment of the present invention;
Fig. 121A is a specific diagram showing the data structure of a card transfer offer for the payment card or the telephone card transfer processing according to the embodiment of the present invention;
Fig. 120B is a specific diagram showing the data structure of a card transfer offer response for the payment card or the telephone card transfer processing according to the embodiment of the present invention;
Fig. 122A is a specific diagram showing the data structure of a card transfer certificate for the ticket transfer processing according to the embodiment of the present invention;
Fig. 121B is a specific diagram showing the data structure of a card transfer receipt for the ticket transfer processing according to the embodiment of the present invention;
Fig. 123A is a specific diagram showing the data structure of a card transfer request for the payment card or the telephone card transfer processing according to the embodiment of the present invention;
Fig. 122B is a specific diagram showing the data structure of a payment card transfer for the payment card transfer processing according to the embodiment of the present invention;
Fig. 122C is a specific diagram showing the data structure of a telephone card transfer for the telephone card transfer processing according to the embodiment of the present invention;
Fig. 124A is a specific diagram showing the data structure of an electronic ticket installation commission for the electronic ticket installation processing according to the embodiment of the present invention;
Fig. 123B is a specific diagram showing the data structure of a ticket installation commission for the electronic ticket installation processing according to the embodiment of the present invention;
Fig. 125A is a specific diagram showing the data structure of an electronic ticket installation commission for the electronic ticket installation processing according to the embodiment of the present invention;
Fig. 124B is a specific diagram showing the structure of electronic ticket installation data for the electronic ticket installation processing according to the embodiment of the present invention;
Fig. 126A is a specific diagram showing the data structure of an electronic payment card installation commission for the electronic payment card installation processing according to the embodiment of the

present invention;
Fig. 125B is a specific diagram showing the data structure of a payment card installation commission request for the electronic payment card installation processing according to the embodiment of the present invention;
Fig. 127A is a specific diagram showing the data structure of an electronic payment card installation commission for the electronic payment card installation processing according to the embodiment of the present invention;
Fig. 126B is a specific diagram showing the structure of electronic payment card installation data for the electronic payment card installation processing according to the embodiment of the present invention;
Fig. 128A is a specific diagram showing the data structure of an electronic telephone card installation commission for the electronic telephone card installation processing according to the embodiment of the present invention;
Fig. 127B is a specific diagram showing the data structure of a telephone card installation commission request for the electronic telephone card installation processing according to the embodiment of the present invention;
Fig. 129A is a specific diagram showing the data structure of an electronic telephone card installation commission for the electronic telephone card installation processing according to the embodiment of the present invention;
Fig. 128B is a specific diagram showing the data structure of electronic telephone card installation data;
Fig. 130A is a specific diagram showing the data structure of a modification request for the electronic telephone card installation processing according to the embodiment of the present invention;
Fig. 129B is a specific diagram showing the data structure of a modification notification according to the embodiment of the present invention;
Fig. 131A is a specific diagram showing the structure of reaction selection data according to the embodiment of the present invention;
Fig. 130B is a specific diagram showing the data structure of a modification instruction according to the embodiment of the present invention;
Fig. 132A is a specific diagram showing the data structure of a refund request according to the embodiment of the present invention;
Fig. 131B is a specific diagram showing the data structure of a refund commission according to the embodiment of the present invention;
Fig. 133A is a specific diagram showing the data structure of a temporary refund receipt according to the embodiment of the present invention;
Fig. 132B is a specific diagram showing the data structure of a refund clearing receipt according to the embodiment of the present invention;
Fig. 134A is a specific diagram showing the data structure of a refund clearing completion notification that is transmitted from the settlement system to the service system according to the embodiment of the present invention;
Fig. 133B is a specific diagram showing the data structure of a refund clearing completion notification that is transmitted from the service system to the ticket issuing system according to the embodiment of the present invention;
Fig. 135A is a specific diagram showing the data structure of a refund receipt that is transmitted from the ticket issuing system to the service system according to the embodiment of the present invention;
Fig. 134B is a specific diagram showing the data structure of a refund receipt that is transmitted from the service system to the mobile user terminal according to the embodiment of the present invention;
Fig. 136A is a specific diagram showing the data structure of a payment offer for the real credit settlement processing according to the embodiment of the present invention;
Fig. 135B is a specific diagram showing the data structure of a payment offer response for the real credit settlement processing according to the embodiment of the present invention;
Fig. 135C is a specific diagram showing the data structure of an authorization request for the real credit settlement processing according to the embodiment of the present invention;
Fig. 135D is a specific diagram showing the data structure of a payment request for the real credit settlement processing according to the embodiment of the present invention;
Fig. 135E is a specific diagram showing the data structure of an authorization response for the real credit settlement processing according to the embodiment of the present invention;
Fig. 135F is a specific diagram showing the data structure of a clearing request that is transmitted, in the real credit settlement processing, from the merchant terminal to the service system according to the embodiment of the present invention;
Fig. 137A is a specific diagram showing the data structure of a clearing request that is transmitted, in the real credit settlement processing, from the service system to the transaction processing system according to the embodiment of the present invention;

Fig. 136B is a specific diagram showing the data structure of a clearing completion notification that is transmitted, in the real credit settlement processing, from the transaction processing system to the service system according to the embodiment of the present invention;
Fig. 136C is a specific diagram showing the data structure of a clearing completion notification that is transmitted, in the real credit settlement processing, from the service system to the merchant terminal according to the embodiment of the present invention;
Fig. 138A is a specific diagram showing the data structure of a receipt that is transmitted, in the real credit settlement processing, from the merchant terminal to the service system according to the embodiment of the present invention;
Fig. 137B is a specific diagram showing the data structure of a receipt that is transmitted, in the real credit settlement processing, from the service system to the mobile user terminal according to the embodiment of the present invention;
Fig. 139A is a diagram for explaining a conventional settlement system that employs a prepayment method using a payment card;
Fig. 138B is a diagram for explaining a conventional ticket selling system;
Fig. 139A is a front view of a mobile user terminal according to a second embodiment of the present invention;
Fig. 139B is a rear view of the mobile user terminal according to the second embodiment of the present invention;
Fig. 140 is a block diagram illustrating the arrangement of the mobile user terminal according to the second embodiment of the present invention;
Fig. 141A is a front view of a mobile user terminal according to a third embodiment of the present invention;

Fig. 141B is a rear view of the mobile user terminal according to the third embodiment of the present invention;
Fig. 141C is a front view of the mobile user terminal in a digital telephone mode where an IC card is not attached to the mobile user terminal according to the third embodiment of the present invention, and a schematic diagram for the IC card;
Fig. 141D is a front view of the mobile user terminal in a credit card mode where the IC card is attached to the mobile user terminal according to the third embodiment of the present invention;
Fig. 142 is a block diagram illustrating the arrangement of the mobile user terminal according to the third embodiment of the present invention;
Fig. 143 is a block diagram illustrating the arrangement of the IC card according to the third embodiment of the present invention; and
Fig. 144 is a specific diagram showing an FeRAM memory map for the IC card according to the third embodiment of the present invention.

[0333] The reference numerals used in the drawings are as follows:

100, 200: mobile user terminal
101: gate terminal
102: merchant terminal
103: merchant terminal
104: automatic vending machine
105, 202: switching center
106: settlement system
107: ticket issuing system
108: payment card issuing system
109: telephone card issuing system
110: service system
111: digital public line network
112, 113, 114, 201: base station
115: telephone terminal
207: installation card
300, 400, 501, 60, 700: infrared communication module (infrared communication port)
301, 601, 701: antenna
302, 602: receiver/loudspeaker
303, 502, 603: LCD
304, 504, 604: mode switch
305, 605: speech switch

306, 606: end switch
307, 506, 607; function switch
308, 403, 507, 608: number key switch
309, 402, 509, 611: power switch
310, 609: microphone
311, 508, 612: execution switch
312, 613: headphone jack
313, 314, 315: image display portion
401, 702: touch panel LCD
404: menu switch
405: lock switch
406, 510: serial cable
503: telephone handset
505: hook switch
511: cash register
512: payment card settlement switch
513: credit clearing switch
514: RS-232C cable
610: bar code reader
614: card slot
703: discharge port
704: product selection switch
705: sold out display (LED)
706: sample
800: electronic telephone card accounting device
801: switch
802: data processor
803: modulator/demodulator
804: base station controller
900: service server
901: server director information server
902: user information server
903: merchant information server
904: transaction processor information server
905: ticket issuer information server
906: payment card issuer information server
907: telephone card issuer information server
908, 1006, 1106, 1206, 1306: management system
909, 910, 1004, 1007, 1104, 1107, 1204, 1207, 1304, 1307: ATM-LAN switch
911, 1005, 1105, 1205, 1305: ATM switch
1000: transaction server
1001: subscriber information server
1002: member store information server
1003: transaction information server
1100: ticket issuing server
1101, 1201, 1301: customer information server
1102: ticket issuing information server
1103: ticket information server
1200: payment card issuing server
1202: payment card issuing information server
1203: payment card information server
1300: telephone card issuing server
1302: telephone card issuing information server
1303: telephone card information server
1400: electronic payment card installation card
1401: electronic telephone card installation card
1402: electronic ticket installation card
1406, 1412, 1418: holographic logo
1407, 1413, 1419: installation card number
1408, 1414, 1420: installation number
1500, 2200, 2600, 3000, 3400, 3800: CPU

1501, 2201, 2601, 3001, 3401, 3801: ROM
1502, 2202, 2602, 3002, 3402, 3802: RAM
1503, 2204, 2604, 3003, 3403, 3804: EEPROM
1504, 2605, 3004: LCD controller
1505, 2205, 2606, 3005, 3404, 3805: cryptographic processor
1506, 2206, 2607, 3006, 3405, 3806: data codec
1508, 2214, 2610, 3008, 3407: control logic unit
1509, 2212, 2611, 3009: key operator
1510, 2211, 2612, 3010, 3415: loudspeaker
1511, 2413, 2613, 3011: audio processor
1512, 2414, 2614, 3012: audio codec
1513, 2415, 2615, 3013, 3408: channel codec
1514, 3014, 3409: modulator
1515, 3015, 3410: demodulator
1516, 3016, 3412: PLL
1517, 3017, 3411: RF unit
1518, 3018: battery capacity detector
1600, 3100, 3500: frame counter
1601, 3101, 3501: start frame counter
1602, 2300, 2700, 3102, 3502: clock counter
1603, 2301, 2701, 3103, 3503: update time register
1604, 2302, 2702, 3104, 3504: interrupt register
1605, 2307, 2703, 3105, 3505: ID register
1606, 2704, 3106, 3506: channel codec control register
1607, 2705, 3107: audio transmission buffer
1608, 2706, 3108: audio reception buffer
1609, 2707, 3109, 3507: data transmission buffer
1610, 2708, 3110, 3508: data reception buffer
1611, 2303, 2709, 3111: audio processor control register
1612, 2306, 2710, 3112: key operator control register
1613, 2711, 3113: audio data encryption key register
2203, 2603, 3803: hard disk
2207: digital telephone communication unit
2208, 2608: serial/parallel converter
2209, 2609: serial port
2210: sound controller
2213: external interface
2304: X coordinate register
2305: Y coordinate register
2308: phone communication control register
2616: digital communication adaptor
2617: RS-232C interface
3059: memory card
3114: key display register
3413, 3807: external interface
3414: control logic unit
3416: price calculator
3417: product manager
3418: product output mechanism
3419: CD-ROM drive
3456: sales mechanism
3455: accounting equipment
13800: payment card
13801: payment card terminal
13802, 13818: center system
13816: ticket
13817: ticket selling terminal

BEST MODES FOR CARRYING OUT THE INVENTION

[0334] The best mode of the present invention will now be described while referring to Figs. 1 to 137.

[0335] In an electronic commerce system according to one embodiment of the present invention, a user (individual consumer) purchases, as electronic information, various types of tickets, payment cards or telephone cards through a network. Thereafter, wireless communication is employed for the examination of a ticket when the user enters a hall, for a transaction when the user employs a payment card to purchase a product or to obtain a service, or for a settlement process when the user employs a telephone card to settle a charge incurred by the use of the wireless telephone communication service. Therefore, this system does not require that a ticket be submitted to an usher for examination, or that cash and a receipt be directly exchanged with a clerk at a retail shop when a product is purchased, or that a SIM Card (Subscriber Identify Module Card) be installed in a wireless telephone terminal, such as a portable telephone or a PHS, to monitor calls initiated at the wireless telephone terminal.

*[0336] In this specification, this system is called an "electronic commerce system," and the various types of services that can be provided by this system are generally called "mobile electronic commerce services."

[0337] As is shown in the system arrangement diagram in Fig. 1, the mobile electronic commerce service, which provides two types of bi-directional wireless communication functions, comprises: a mobile user terminal 100, which can function as an electronic ticket, an electronic payment card, an electronic telephone card and an electronic credit card (bank card); a gate terminal 101, which can perform an automatic examination process for a ticket; a merchant terminal 102, which can be used for a payment settlement process or a credit settlement process performed at a cash register counter in a retail shop; a merchant terminal 103, which can be used for a payment settlement process or a credit settlement process performed in a mobile environment; an automatic vending machine 104, which has a payment settlement function; a switching center 105 for a digital wireless telephone, which has a payment settlement function that is used for wireless telephone communications; a transaction processing system 106, which can be used to perform a credit settlement process at a credit service company or a settlement company; a ticket issuing system 107, which is used for issuing a ticket at an event company or a ticket issuance company; a payment card issuing system 108, which is used for issuing a payment card at a retail sales company or at a payment card issuance company; a telephone card issuing system 109, which is used for issuing a telephone card for wireless telephone communication at a wireless telephone communication company or a telephone card issuance company; a service system 110, which constitutes the center of a communication network that connects together the mobile user terminal 100, the gate terminal 101, the merchant terminals 102 and 103, the automatic vending machine 14, the switching center 105, the transaction processing system 106, the ticket issuing system 107, the payment card issuing system 108 and the telephone card issuing system 109, and which provides a mobile electronic commerce service; a digital public line network 111, which provides a data transmission path for the network; a wireless telephone base station 112, which connects the mobile user terminal 100 to the switching center 105; a wireless telephone base station 113, which connects the merchant terminal 103 to the digital public line network 111; a wireless telephone base station 114, which connects the automatic vending machine 104 to the digital public line network 111; and a destination telephone terminal 115, which is connected to the digital public line network 111 when in use.

[0338] The mobile user terminal 100 is a portable, wireless telephone terminal that has two types of bi-directional wireless communication functions, infrared communication and digital wireless telephone communication; an electronic ticket function; an electronic payment card function; an electronic telephone card function; and an electronic credit card function.

[0339] The merchant terminal 103 and the automatic vending machine 104 also have two types of bi-directional wireless communication functions. And the gate terminal 101 and the merchant terminal 102 also have the two types of bi-directional communication functions, infrared communication and digital wireless telephone communication.

[0340] The base station 112 has a function, for which a control channel extending to the mobile user terminal 100 is employed, involving the transmission of settlement information that is exchanged by the mobile user terminal 100 and the switching center 105.

[0341] The telephone terminal 115 is an arbitrary telephone terminal to which a connection can be made across the digital public line network 111, and can be either a fixed telephone terminal or a mobile wireless

telephone terminal.

[0342] In Fig. 1, reference numeral 116 denotes a transmission path for digital wireless telephone communication between the mobile user terminal 100 and the base station 112; 117, a digital communication line for connecting the base station 112 to the switching center 105; 118, a digital communication line for connecting the switching center 105 and the digital public line network 111; 119, a transmission path for infrared communication conducted between the mobile user terminal 100 and the gate terminal 101; 120, a digital telephone communication line for connecting the gate terminal 101 and the digital public line network 111; 121, a transmission path for infrared communication conducted between the mobile user terminal 100 and the merchant terminal 102; 122, a digital telephone communication line for connecting the merchant 102 and the digital public line network 111; 123, a transmission path for infrared communication conducted between the merchant terminal 103 and the base station 113; 125, a digital communication line for connecting the base station 113 to the digital public line network 111; 126, a transmission path for infrared communication conducted between the mobile user terminal 100 and the automatic vending machine 104; 127, a transmission path for digital wireless communication conducted between the automatic vending machine 104 and the base station 114; 128, a digital communication line for connecting the base station 114 to the digital public line network 111; 129, a telephone communication line for connecting the telephone terminal 115 to the digital public line network 111; 130, a digital communication line for connecting the digital public line network 111 to the service system 110; 131, a digital communication line for connecting the service system 110 and the transaction processing system 106; 132, a digital communication line for connecting the service system 110 and the ticket issuing system 107; 133, a digital communication line for connecting the service system 110 and the payment card issuing system 108; and 134, a digital communication line for connecting the service system 110 and the telephone card issuing system 109. Through multiplexing, the digital communication lines 130 to 134 especially can serve as multiple communication lines.

[0343] The following system is employed as the normal operating system for the mobile electronic commerce service.

[0344] The transaction processing system 106 is installed at a credit card company, a bank, or a settlement processing company. The ticket issuing system 107 is installed at an event company or a ticket issuance company. The payment card issuing system 108 is installed at a retail sale company or a payment card issuance company. The telephone card issuing system 109 is installed at a wireless telephone communication company or a telephone card issuance company.

[0345] The gate terminal 101 is installed at the entrance to a movie theater or to an event hall, and the merchant terminal 102 is installed at a cash register counter in a retail shop. The merchant terminal 103 is carried by a sales clerk or a person in charge of collecting money, and the mobile user terminal 100 is carried by a consumer. The service system 110 is installed at a company that provides the mobile electronic commerce service.

[0346] Further, the following relationship is assumed as constituting a social relationship among the individual devices that form the mobile electronic commerce system and among the owners of the individual systems.

[0347] A consumer who owns a mobile user terminal 100 enters into a credit service membership contract with a credit card company or a bank, a mobile electronic commerce service membership contract with a company that provides the mobile electronic commerce service, and a wireless telephone communication service contract with a wireless telephone communication company.

[0348] The owner of the gate terminal 101, for example, a manager of a movie theater or an event hall, has entered into a contract with the owner of the ticket issuing system 107 for handling tickets issued by the ticket issuing system, a mobile electronic commerce service member store contract with a company that provides the mobile electronic commerce service, and a digital telephone communication service contract with a telephone communication company. The owner of the gate terminal 101 may be the same individual who owns the ticket issuing system 107.

[0349] The retail shop that owns the merchant terminal 102 has entered into a contract with the owner of the payment card issuing system 108 for the handling of the payment cards issued by the payment card issuing system, a credit card member store contract with a credit card company or a bank, a mobile electronic commerce service member store contract with a company that provides the mobile electronic

commerce service, and a digital telephone communication service contract with a telephone communication company. The owner of the merchant terminal 102 may be the same individual who owns the payment card issuing system 108.

[0350] The owner of the merchant terminal 103 has entered into a contract with the owner of the payment card issuing system 108 for the handling of the payment cards issued by the payment card issuing system, a credit card member store contract with a credit card company or a bank, a mobile electronic commerce service member store contract with a company that provides the mobile electronic commerce service, and a digital telephone communication service contract with a telephone communication company. The owner of the merchant terminal 103 may be the same individual who owns the payment card issuing system 108.

[0351] The owner of the automatic vending machine 104 has entered into a contract with the owner of the payment card issuing system 108 for the handling of the payment cards issued by the payment card issuing system, a mobile electronic commerce service member store contract with a company that provides the mobile electronic commerce service, and a digital telephone communication service contract with a telephone communication company. The owner of the automatic vending machine 104 may be the same individual who owns the payment card issuing system 108.

[0352] The wireless telephone communication company, which is the owner of the switching center 105, has entered in a contract with the owner of the telephone card issuing system 109 for the handling of the telephone cards issued by the telephone card issuing system, and a mobile electronic commerce service member store contract with a company that provides the mobile electronic commerce service. The wireless telephone communication company may be the owner of the telephone card issuing system 109.

[0353] The owner of the ticket issuing system 107 enters into a credit service member store contract with a credit card company or a bank, a mobile electronic commerce service ticket issuer contract with a company that provides the mobile electronic commerce service, and a digital communication service contract with a communication service company. The company that provides the mobile electronic commerce service may own the ticket issuing system 107.

[0354] The owner of the payment card issuing system 108 enters into a credit service member store contract with a credit card company or a bank, a mobile electronic commerce service ticket issuer contract with a company that provides the mobile electronic commerce service, and a digital communication service contract with a communication service company. The company that provides the mobile electronic commerce service may own the payment card issuing system 108.

[0355] The owner of the telephone card issuing system 109 has entered into a credit service member store contract with a credit card company or a bank, a mobile electronic commerce service ticket issuer contract with a company that provides the mobile electronic commerce service, and a digital communication service contract with a communication service company. The company that provides the mobile electronic commerce service may own the telephone card issuing system 109.

[0356] The company that provides the mobile electronic commerce service has entered into a contract with one or more credit card companies, or banks acting for the credit card companies, or a bank to issue electronic credit cards (bank cards) and to provide a credit card service for a member store who has entered into a contract for the credit service. The mobile electronic commerce service company also has entered into a contract with the owner of the ticket issuing system 107 to act for the ticket issuing system and to issue electronic tickets and to provide a ticket card service; has entered into a contract with the owner of the payment card issuing system 108 to act for the payment card issuing system and to issue electronic payment cards and to provide a payment settlement service; and has entered into a contract with the owner of the telephone card issuing system 109 to act for the telephone card issuing system and to issue electronic telephone cards and to provide a wireless telephone payment settlement service.

[0357] To perform credit settlements using the transaction processing system 106, the settlement processing company has entered into a contract with one or more credit card companies or banks to act for them and to perform the credit settlements.

[0358] When the transaction processing system used to perform credit settlements differs from that for credit cards, a plurality of transaction processing systems having the same form as the transaction processing system 106 in Fig. 1 are connected to the service system 110 via digital communication lines.

[0359] Similarly, when the ticket issuing system differs, depending on the ticket type, a plurality of ticket issuing systems having the same form as the ticket issuing system 107 in Fig. 1 are connected to the service system 110 via digital communication lines. Also, when the payment card issuing system differs, depending on the payment card type, a plurality of payment card issuing systems having the same form as the payment card issuing system 108 in Fig. 1 are connected to the service system via digital communication lines. And when the telephone card issuing system differs, depending on the telephone card type, a plurality of telephone card issuing systems having the same form as the telephone card issuing system 109 in Fig. 1 are connected to the service system 110 via digital communication lines.

[0360] In order to simplify the following explanation of the system of the present invention, a consumer who owns a mobile user terminal 100 is called a user; a person who owns a merchant terminal 103 or an automatic vending machine 104 for the provision and sale of products and services is called a merchant; a wireless telephone communication company that owns a switching center 105 and provides a wireless telephone communication service is called a communication service provider; a company that owns a service system 110 and provides a mobile electronic commerce service is called a service provider; a credit card company or a settlement processing company that owns a transaction processing system 106 and performs a credit settlement process is called a transaction processor; a person who owns a ticket issuing system 107 and sells tickets is called a ticket issuer; a person who owns a payment card issuing system 108 and sells payment cards is called a payment card issuer; and a person who owns a telephone card issuing system 109 and sells telephone cards is called a telephone card issuer.

[0361] The mobile electronic commerce services that are provided by the system of this invention are generally broken down into four main types: an electronic ticket service, an electronic payment card service, an electronic telephone card service and an electronic credit card service.

[0362] The electronic ticket service is a complete electronic service for the vending of a ticket via a network, the delivery of a ticket that is accomplished subsequent to its purchase, and the use of the ticket.

[0363] Specifically, a user employs the mobile user terminal 100 to purchase a ticket from the ticket issuing system 107. The user receives, from the service system, an electronic ticket consisting of electronic information, and stores and manages the ticket in the mobile user terminal. Then, to use the electronic ticket stored in the mobile user terminal the user presents the mobile user terminal to the gate terminal 101, whereat the electronic ticket information is extracted and examined.

[0364] The electronic payment card service is a complete electronic service for the vending of a payment card via a network, the delivery of a payment card that is accomplished subsequent to its purchase, and a charge settlement process performed with the payment card.

[0365] Specifically, a user, through the service system 110, employs the mobile user terminal 100 to purchase a payment card from the payment card issuing system 108. Thereafter, the user receives, from the service system, an electronic payment card consisting of electronic information, and stores and manages it in the mobile user terminal. To use the electronic payment card, while in communication with the merchant terminal 102 (or the merchant terminal 103 or the automatic vending machine 104) the user presents the mobile user terminal, in which the electronic payment card is stored, to the merchant terminal 102, and charge settlement information provided by the electronic payment card is extracted in order to perform a charge settlement process.

[0366] The electronic telephone card service is a complete electronic service for the vending of a telephone card via a network, the delivery of a telephone card that is accomplished subsequent to its purchase, and the use of the telephone card to settle a charge incurred through wireless telephone communication.

[0367] Specifically, a user, through the service system 110, employs the mobile user terminal 100 to purchase a telephone card from the telephone card issuing system 109. Thereafter, the user receives, from the service system, an electronic telephone card consisting of electronic information, and stores and manages it in the mobile user terminal. To use the electronic telephone card, while in communication with the switching center 105 the user presents the mobile user terminal, in which the electronic telephone card is stored, and information is extracted to settle a charge for wireless telephone communication incurred while the electronic telephone card is in use.

[0368] The electronic credit card service is a complete electronic service for which a credit card is used to settle the cost of a ticket, a payment card, or a telephone card that is purchased via a network, and to settle

charges incurred at a normal retail shop.

[0369] Specifically, an electronic credit card, which consists of electronic information, is stored in advance and managed in the mobile user terminal 100 and the service system 110. When a user purchases a ticket, a payment card or a telephone card using the service system, through the exchange of data with the transaction processing system 106 the service system presents the card number of the credit card that is designated by the user, and provides credit settlement information to be used to perform a credit settlement process for the purchase cost. To perform a credit settlement process with the merchant terminal 102 (or the merchant terminal 103) at a retail shop, settlement information is exchanged by the mobile user terminal and the merchant terminal 102 (or the merchant terminal 103), by the merchant terminal 102 (or the merchant terminal 103) and the service system 110, and by the service system 110 and the mobile user terminal 100. Also, through data communication with the transaction processing system 106, the service system 110 presents the card number of the credit card designated by the user and provides the credit settlement information required to settle an accessed charge.

[0370] A detailed explanation will be given later for the electronic ticket service, the electronic payment card service, the electronic telephone card service and the electronic credit card service.

[0371] For these four services, transmission paths or communication lines are constantly employed for data communication by the individual devices of the system.

[0372] First, the mobile user terminal 100 uses a digital wireless telephone to communicate with the switching center 105 via the transmission path 116, the base station 112 and the digital communication line 117, and with the service system 110 via the digital communication line 118, the digital public line network 111 and the digital communication line 130; and uses infrared communication to communicate with the gate terminal 101 via the transmission path 119, with the merchant terminal 102 via the transmission path 121, with the merchant terminal 103 via the transmission path 123, and with the automatic vending machine 104 via the transmission path 126.

[0373] The gate terminal 101 employs digital telephone communication to communicate with the service system 110 via the digital telephone communication line 120, the digital public line network 111 and the digital communication line 130.

[0374] The merchant terminal 102 employs digital telephone communication to communicate with the service system 110 via the digital telephone communication line 122, the digital public line network 111 and the digital communication line 130.

[0375] The merchant terminal 103 employs digital telephone communication to communicate with the service system 110 via the transmission path 124, the base station 113, the digital communication line 125, the digital public line network 111 and the digital communication line 130.

[0376] The automatic vending machine 104 employs digital telephone communication to communicate with the service system 110 via the transmission path 127, the base station 114, the digital communication line 128, the digital public line network 111 and the digital communication line 130.

[0377] Digital data are exchanged by the service system 110 and the transaction processing system 106 via the digital communication line 131, by the service system 110 and the ticket issuing system 107 via the digital communication line 132, by the service system 110 and the payment card issuing system 108 via the digital communication line 133, and by the service system 110 and the telephone card issuing system 109 via the digital communication line 134.

[0378] All the information to be exchanged is first encrypted and is then exchanged through communication conducted, between the mobile user terminal 100 and the service system 110, between the gate terminal 101 and the service system 110, between the merchant terminal 102 and the service system 110, between the merchant terminal 103 and the service system 110, between the automatic vending machine 104 and the service system 110, between the switching center 105 and the service system 110, between the service system 110 and the transaction processing system 106, between the service system 110 and the ticket issuing system 107, between the service system 110 and the payment card issuing system 108, and between the service system 110 and the telephone card issuing system 109. A secret key and a public key are employed for encrypting the information, and the encrypted information is electronically closed and transmitted.

[0379] In this system, an electronic ticket, an electronic payment card, or an electronic telephone card stored in the mobile user terminal 100 can be transferred to a different user who owns a mobile user terminal. With this function, multiple tickets can be purchased and transferred to friends, etc., or an electronic payment card or an electronic telephone card can be provided as a gift, so that the usage range can be expanded.

[0380] In Fig. 2A is shown the system configuration where an electronic ticket, an electronic payment card or an electronic telephone card is transferred between mobile user terminals 100 and 200.

[0381] In Fig. 2, reference numeral 203 denotes a transmission path used for infrared communication between the mobile user terminals 100 and 200. The mobile user terminal 200 is connected to the digital public line network 111 via a base station 201 for a digital wireless telephone, a digital communication line 205, a switching center 202 for a digital wireless telephone, and a digital communication line 206.

[0382] Basically, transfer information is exchanged by the mobile user terminals 100 and 200 when transferring an electronic ticket, an electronic payment card or an electronic telephone card. For the exchange of transfer information, infrared communication or digital wireless telephone communication is employed by the mobile user terminals 100 and 200. Generally, when the user of the mobile user terminal 100 and the user of the mobile user terminal 200 are very near each other (within a distance of approximately 1 meter), infrared communication is employed for a transfer process. But when the two users are distant from each other, digital wireless telephone communication is employed for the transfer process.

[0383] To perform the transfer process by employing digital wireless telephone communication, the mobile user terminal 100 communicates with the mobile user terminal 200 via the transmission path 116, the base station 112, the digital communication line 117, the switching center 105, the digital communication line 118, the digital public line network 111, the digital communication line 206, the switching center 202, the digital communication line 205, the base station 201 and the transmission path 204.

[0384] Actually, the base station 112 and the base station 201, or the switching center 105 and the switching center 202, may be identical to each other in accordance with the geographical positional relationship existing between the mobile user terminals 100 and 200.

[0385] A detailed explanation will be given later for the transfer process employed for an electronic ticket, an electronic payment card or an electronic telephone card.

[0386] In this system, an electronic payment card, an electronic telephone card or an electronic ticket can be procured as a common retail purchase for installation in the mobile user terminal 100. Specifically, an installation card 207 (see Fig. 2B) made of a comparatively low cost material, such as paper, plastic or vinyl chloride, is employed as a distribution medium for the electronic payment card, the electronic telephone card or the electronic ticket.

[0387] For an electronic payment card, for example, the payment card issuer issues an installation card 207 on which is printed identification information (installation information) for a payment card to be issued, and makes the installation card 207 available for sale at a retail sales outlet, such as a convenience store or a kiosk at a station. When a user purchases an installation card or receives one as a gift, he or she employs the mobile user terminal 100, through the service system 110, to request that the payment card issuing system 108 install the electronic payment card. The user then receives the electronic payment card from the service system and installs the electronic payment card in the mobile user terminal 100.

[0388] Similarly, for an electronic telephone card, the telephone card issuer issues an installation card 207 on which identification information (installation information) for a telephone card to be issued is printed, and makes the installation card 207 available for sale at a retail sales outlet. When a user purchases an installation card or receives one as a gift, he or she employs the mobile user terminal 100, through the service system 110, to request that the telephone card issuing system 109 install the electronic telephone card. The user then receives the electronic telephone card from the service system and installs the electronic telephone card in the mobile user terminal 100.

[0389] In the same manner, for an electronic ticket, the ticket issuer issues an installation card 207 on which identification information (installation information) for a ticket to be issued is printed, and makes the installation card 207 available for sale at a retail sales outlet, such as a convenience store or a theater

ticket agency. When a user purchases the installation card or receives it as a gift, he or she employs the mobile user terminal 100, through the service system 110, to request that the ticket issuing system 107 install the electronic ticket. The user then receives the electronic ticket from the service system and installs the electronic telephone card in the mobile user terminal 100.

[0390] The merits of an installation card are that no communication fee is required to purchase an electronic payment card, an electronic telephone card or an electronic ticket, and that actually the installation card can be held in one's hand. In particular, the demand for the installation card for the electronic payment card or for the electronic telephone card can be increased as a gift or a collection item, and this results in the expansion of the range of the usage of the electronic payment card and the electronic telephone card. In addition, the installation card for the electronic ticket adequately provides for the purchase non-seat-reserved tickets, such as those for movies and art exhibitions.

[0391] A detailed explanation of the installation process will be given later using the installation card for the electronic payment card, the electronic telephone card or the electronic ticket.

[0392] The individual components of the system will now be described.

[0393] First, the mobile user terminal 100 will be described.

[0394] Figs. 3A and 3B are a front view and a rear view of the mobile user terminal 100.

[0395] In Fig. 3A, reference numeral 300 denotes an infrared communication port (infrared communication module) used when engaging in infrared communication with the merchant terminal 101; 301, an antenna for receiving and transmitting radio signals for a digital wireless telephone; 302, a receiver loudspeaker; 303, a 120 x 160 pixel color liquid crystal display (LCD); 304, a mode switch for changing the operating mode of the mobile user terminal 100; 305, a speech switch for the digital wireless telephone; 306, an end switch for the digital wireless telephone; 307, a function switch; 308, number key switches; 309, a power switch; and 310, a microphone.

[0396] In Fig. 3B, reference numeral 311 denotes an execution switch used to permit processing when confirmation by a user is required, such as confirmation of the payment of a quoted price and confirmation of the terms agreed to for a settlement; and 312, a headphone jack used for connecting a headphone set.

[0397] The mobile user terminal 100 has six operating modes: a digital wireless telephone mode, a telephone card mode, a payment card mode, a credit card mode, a ticket mode, and a personal information management mode. The mode switch 304 is used to select these modes.

[0398] In Figs. 3A, 3C, 3D and 3E are shown the respective screens displayed on the LCD 303 in the credit card mode, the ticket mode, the payment card mode and the telephone card mode. In Figs. 3F, 3G and 3H are shown other example screens displayed on the LCD 303 in the ticket mode, the payment card mode and the telephone card mode. While in Figs. 3A, 3C, 3D and 3E only characters are displayed on the screens, in Figs. 3F, 3G and 3H image information, such as the images 313, 314 and 315, is also displayed. In the electronic ticket mode, as in the other modes, the image information is included in the representative component information for an electronic ticket program, which will be described later while referring to Figs. 19, 20 and 21.

[0399] In the digital wireless telephone mode, the mobile user terminal 100 serves as a digital wireless telephone based on the contract with the communication service provider that provides the digital wireless telephone service. In the telephone card mode, the mobile user terminal 100 serves as a digital wireless telephone that employs the electronic telephone card for the payment of a communication charge. Further, the mobile user terminal 100 serves as an electronic payment card in the payment card mode, serves as an electronic credit card in the credit card mode, and serves as an electronic ticket in the ticket mode.

[0400] The personal information management mode is the operating mode used for managing the personal information for a user that is stored in the mobile user terminal 100. In the personal information management mode, the user refers to the personal information and portrait data that are stored, and sets the user setup information.

[0401] Multiple payment cards, telephone cards and electronic tickets can be registered in the mobile user terminal 100 using the purchase and transfer process available on the network, or during the installation

process using the installation card.

[0402] The electronic credit card is registered in the mobile user terminal 100 on the assumption that a subject user is a party to a membership contract for credit servicing entered into with a credit card company. When a subject user is a party to multiple credit service membership contracts, multiple credit cards are registered in the mobile user terminal 100.

[0403] When, for example, a user places a call using the mobile user terminal 100, first, he or she manipulates the mode switch 304 and sets the operating mode to the digital wireless telephone mode. Then, the user enters a phone number using the number key switches 308 and depresses the speech switch 305. By employing the above operation, the user can place a call to a destination corresponding to the telephone number that was entered.

[0404] To receive a call at the mobile user terminal 100, the mobile user terminal 100 generates a call reception tone, regardless of the current operating mode. Then, the operating mode can be automatically changed to the digital wireless telephone mode simply by the depression of the speech switch 305 and the user can answer the call.

[0405] To place a call using the electronic telephone card, first, a user sets the operating mode to the telephone card mode by manipulating the mode switch 304, and employs the function switch 307 (F1 or F2) to select an electronic telephone card to be used to make the payment for the communication charge (to display on the LCD the electronic telephone card to be used for the payment: see Fig. 3E). Then, the user enters the telephone number using the number key switches 308 and depresses the speech switch 305. By employing this operation, the user can place a call to the destination that corresponds to the telephone number that was entered, while the communication charge is subtracted from the credit total held by the electronic telephone card.

[0406] To pay a quoted price using the electronic payment card, first, the user manipulates the mode switch 304 to set the operating mode to the payment card mode, and employs the function switch 307 (F1 or F2) to select a payment card to be used for the payment (to display on the LCD the electronic payment card to be used for the payment: see Fig. 3D). Then, the user enters the payment value using number key switches 308 and depresses the execution switch 311, while directing the infrared communication port 300 toward the merchant terminal 102 of the merchant (or the merchant terminal 103 or the automatic vending machine 104). Through this operation, the mobile user terminal 100 is enabled to engage in infrared communication with the merchant terminal 102 (or the merchant terminal 103 or the automatic vending machine 104), and can exchange settlement information for setting the terms for the payment to be made using the electronic payment card.

[0407] To pay a quoted price to a merchant using credit, first, a user manipulates the mode switch 304 to set the operating mode to the credit card mode, and then employs the function switch 307 (F1 or F2) to select a credit card to be used for payment (to display on the LCD the electronic credit card to be used for the payment: see Fig. 3A). Then, the user enters the amount of the payment using the number key switches 308 and depresses the execution switch 311, while directing the infrared communication port 300 toward the merchant terminal 102 of the merchant (or the merchant terminal 103). Through this operation, the mobile user terminal 100 is enabled to engage in infrared communication with the merchant terminal 102 (or the merchant terminal 103). The mobile user terminal also participates in digital wireless telephone communication with the service system 100 and transmits the settlement information for credit clearance.

[0408] To present an electronic ticket for electronic ticket examination, first, a user manipulates the mode switch 304 to set the operating mode to the ticket mode, and employs the function switch 307 (F1 or F2) to select a ticket to be presented (to display on the LCD the electronic ticket to be used: see Fig. 3C). Then, the user depresses the execution switch 311, while directing the infrared communication port 300 toward the gate terminal 101 that is installed at the entrance to a movie theater or an event hall. Through this operation, the mobile user terminal 100 is enabled to engage in infrared communication with the gate terminal 101, and to provide information for the examination of the electronic ticket.

[0409] A detailed explanation will be given later to describe the internal structure and the operation of the mobile user terminal 100.

[0410] The gate terminal 101 will now be explained.